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Enhancing the Quality of U.S. Grain for International Trade

Volume II -- Background Papers

Part D: Major U.S. Grain Competitors

1. A Comparison of Quality Factors of the Argentine and United States Grain Systems
2. A Comparison of the Quality Factors of the Brazilian and United States Grain Systems
3. A Comparison of Quality Factors of the French and United States Grain Systems
4. A Comparison of Quality Factors of Canadian and United States Grain Systems
5. A Comparison of Quality Factors of the Australian and United States Grain Systems

August 1989

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Part D: Major U.S. Grain Competitors

Paper No.

1. A Comparison of Quality Factors of the Argentine and United States Grain Systems by Lowell D. Hill, Thomas E. Weidner, Robert A. Zortman, Michael J. Phillips, and James G. McGrann

2. A Comparison of the Quality Factors of the Brazilian and United States Grain Systems by Lowell D. Hill, Thomas E. Weidner, Robert A. Zortman, and Mary J. Schultz

3. A Comparison of Quality Factors of the French and United States Grain Systems by William W. Wilson, Lowell D. Hill, Robert A. Zortman, Michael J. Phillips, and E. Wesley Peterson

4. A Comparison of Quality Factors of Canadian and United States Grain Systems by Colin A. Carter, Andrew Schmitz, David M. Orr, and Robert A. Zortman

5. A Comparison of Quality Factors of the Australian and United States Grain Systems by William W. Wilson, David M. Orr, Robert A. Zortman, and Michael J. Phillips

Background Paper No. 1

A Comparison of Quality Factors of the Argentine and United States Grain Systems

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A COMPARISON OF GRAIN GRADING AND MARKETING IN ARGENTINA AND THE UNITED STATES

EXECUTIVE SUMMARY

Argentine grain quality is influenced by several regulations, agencies, and incentives, starting with variety approval and carrying through inspection as the ocean vessel is loaded. Genetic control in corn, soybeans, and wheat has only minor influences on end use qualities. The latent possibilities have not yet been exploited. The shift from flint to dent may have been slowed by governmental control over varieties and by government pricing discounts for dent but it has not been stopped. In contrast there are no government controls over the varieties of corn, soybean and wheat sold to farmers in the United States. Information on quality is not even provided in state yield tests, used to help farmers select varieties for planting.

A simplified grading system, government decreed premiums for No. 1 corn, and a government mandatory grading system starting at the country elevator encourage clean, dry grain of uniformly high quality with respect to grade factors. Argentina has only one grade for soybeans and fewer numerical grades for corn and wheat than the United States. In the United States, grading at the country elevator and in the domestic market channel is permissive. Only export grades are mandatory. In Argentina all grain moving in the market system is required to meet one of their numerical grades. Corn, soybeans and wheat in the United States may be bought and sold on any grade or on grade factors where limits exceed the maximum for the higher numerical grade.

Lack of on-farm drying and storage in Argentina results in delivery of most grain at harvest quality prior to storage. In the United States more than half the production is stored on farms often without proper conditioning and cleaning. In Argentina a maximum moisture for commercial trade is mandated. Nearly all grain is stored at safe storage levels, reducing the need or the opportunity for blending. In the United States corn is often stored at moisture levels too high for long term storage. Producers use higher moistures to avoid weight losses when selling at a fixed base moisture and reduce drying costs; elevators store at higher moistures to reduce drying costs and to take advantage of income from blending later in the crop year.

Blending is possible under both the U.S. and Argentine systems. However, the potential income from blending is greater under the U.S. system and blending that conflicts with good quality control is much less frequent in Argentina.

Technology of production, harvesting, and marketing in Argentina is similar to that in the United States. Farmers in both countries have equal technology for quality control. Argentina farmers take less responsibility than U.S. Farmers for conditioning and storage. U.S. farmers have greater selection of varieties from which to choose, although the range of genetic diversity may not be significantly greater since many U.S. varieties are identical genetic strains.

Inspection and quality analysis in Argentina is similar to that in the United States. In both countries there is a federal agency with ultimate responsibility. In Argentina this responsibility includes inspections extending from the port back to the first handler. In the U.S. the responsibility for inspection is primarily at the port with private inspection agencies under federal supervision conducting most inspections in domestic trade. Inspection and analytical technology are similar in both countries except for the U.S. requirement that export elevators use diverter samplers on export cargos.

Quality as defined by grade factors is generally better in Argentina than in the United States. Their grain is generally drier, cleaner and contains less damage. However, quality in terms of value for processing is not uniformly superior. Breakage susceptibility of corn, corn wet milling yields, baking properties of wheat, and oil and protein content of soybeans are a few examples where U.S. grains are equal if not superior to that in Argentina.

REVISED: January 14, 1988

A COMPARISON OF GRAIN GRADING AND MARKETING IN ARGENTINA AND THE UNITED STATES

An Interim Report to Office of Technology Assessment

By Lowell D. Hill

Argentina, Brazil and the United States compete in many of the same world markets for corn, wheat and soybeans. They are major producers of feed grains and oilseeds as well as large consumers of these grains and processed products. The relative positions of these three countries in world production and export markets have changed over the past twenty years. In general these changes have resulted in a weakening of the United States' position in international markets.

The causes of the shifts in market shares are many and have been described and analyzed in many publications.[1] In addition the marketing practices, market institutions, and delivered quality differ among these three countries and must be included in a list of explanatory variables. Understanding these differences and their relationship to market shares will help to assess the strengths and weaknesses of the U.S. system, providing a basis for recommending policy changes.

OVERVIEW OF THE 3-COUNTRY GRAIN INDUSTRY

Corn

The three countries of Brazil, Argentina and the United States accounted for 51.3 percent of world production in 1986/87; about the same as in 1975, but 12.8 percentage points higher than the twenty year low of 38.5 percent in 1983 (Table 1). This low point was the result of the combination of the US PIK program and the 1983 drought. The United States dominates world production accounting for over 40 percent in every year since 1970, except for 1983.

Argentina has had no significant trend in production but has experienced wide annual fluctuations due to weather (Table 2). A record 9.92 mmt in 1970 was followed by a 5.87 mmt crop in 1971. With such wide swings in production, exports as a percent of total usage have also varied from 34 percent in 1971 to 71 percent in 1980 (Table 3). Domestic feed use has shown a steady increase, but is still much smaller (about one-fifth) than feed use in Brazil. Industrial use of corn in Argentina (Domestic Other, Table 2) has grown from .5 mmt in 1964 to 1.7 mmt in 1973, declining again to .9 mmt in 1986. The primary user is the wet milling industry, but the statistics also include small volumes used in the dry milling industry and the feed processing industry.

[1] An analysis and bibliography is provided in USDA, ERS, Embargoes, Surplus Disposal and US Agriculture, AER No. 564, Washington D.C., Dec. 1986.

Table 1. Production and export of corn as a share of world totals - United States, Brazil and Argentina, 1970 - 1986/87

World Production Shares (in %)

Year	1986/87	1985/86	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	43.8	53.1	42.5	43.3	30.5	46.8	46.2	42.6	45.7	40.4
Brazil	5.5	4.2	4.8	4.7	5.4	4.8	4.7	5.1	5.0	5.4
Argentina	2.0	2.5	2.5	2.1	2.6	2.1	2.9	1.6	2.4	3.6
	51.3	59.8	49.8	50.1	38.5	53.7	53.8	49.3	53.1	49.4

World Export Shares (in %)

Year	1986/87	1985/86	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	65.6	57.6	69.8	71.2	69.0	69.9	69.1	78.6	65.3	49.4
Brazil	N/A	N/A	N/A	0.3	1.1	0.8	<0.1	<0.1	2.2	5.0
Argentina	9.5	13.5	10.5	8.0	9.5	7.5	11.5	4.3	7.6	17.9

Sources: 1970-1984: FAO Production Yearbook, various years, Rome: FAO Trade Yearbook, various years, Rome.

1984/85-1986/87: USDA-FAS, World Grain Situation and Outlook, Circular Series FG-6-87, May 1987.

Table 2. Production and Utilization of Corn in Argentina, 1964-1986 (in 1,000 mt)[1]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Dom Feed	Dom Oth	Ttl Dom Use	End Stx	Local Mktg Year
64	3062	16.8	5144	24	0	5168	2707	1931	501	2432	29	65/66
65	3274	21.5	7039	29	1	7069	4010	2559	483	3042	17	66/67
66	3450	23.2	8004	17	0	8021	4153	3270	558	3828	40	67/68
67	3378	19.4	6553	40	1	6595	3448	2466	668	3134	13	68/69
68	3556	19.3	6863	13	0	6876	3740	2381	743	3124	12	69/70
69	4017	23.3	9360	12	0	9371	5510	2957	883	3840	21	70/71
70	4066	24.4	9921	21	1	9943	6436	2285	532	2817	690	71/72
71	3147	18.6	5853	690	1	6545	2040	3594	387	3981	524	72/73
72	3565	25.2	8984	524	0	9508	5066	2781	1111	3892	550	73/74
73	3486	28.4	9900	550	0	10450	5399	2954	1661	4615	436	74/75
74	3070	24.1	7399	436	0	7834	3517	2477	1420	3897	420	75/76
75	2766	21.1	5836	761	0	6597	3238	2563	300	2963	515	76/77
76	2532	32.8	8305	515	0	8820	5231	3101	300	3401	183	77/78
77	2660	36.5	9709	183	0	9892	5916	3250	283	3533	434	78/79
78	2899	31.0	8987	434	0	9421	5965	3050	246	3296	173	79/80
79	2490	25.7	6399	173	0	6572	3417	2800	248	3048	108	80/81
80	3394	38.0	12897	108	0	13005	9098	3400	300	3700	210	81/82
81	3170	30.3	9605	210	0	9815	5765	3200	300	3500	545	82/83
82	2970	30.3	8999	545	0	9544	6056	2900	300	3200	289	83/84
83	3025	30.4	9196	289	0	9485	5448	3650	300	3950	91	84/85
84	3350	34.3	11491	91	0	11582	7126	3475	600	4075	390	85/86
85	3500	34.6	12110	390	0	12500	7500	4300	300	4600	390	86/87
86	3400	35.3	12002	390	0	12392	7500	3700	900	4600	290	87/88
87			0	290		290						88/89

---

[1] Harvested acreage in 1,000 hectares; yields in quintals per hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

Table 3. Exports and Domestic Use of Corn as a Share of Total Domestic Supplies – United States, Brazil, and Argentina, 1964-1986 (in %)

	Exports as % Total Usage			Domestic Use as % Total Usage		
	Arg	Brazil	U.S.	Arg	Brazil	U.S.
64	53%	5%	14%	47%	95%	86%
65	57%	5%	15%	43%	95%	85%
66	52%	4%	11%	48%	96%	89%
67	52%	10%	14%	48%	90%	86%
68	54%	5%	12%	46%	95%	88%
69	59%	12%	13%	41%	88%	87%
70	70%	7%	11%	30%	93%	89%
71	34%	1%	15%	66%	99%	85%
72	57%	0%	21%	43%	100%	79%
73	54%	8%	21%	46%	92%	79%
74	47%	6%	24%	53%	94%	76%
75	53%	9%	29%	47%	91%	71%
76	61%	11%	29%	39%	89%	71%
77	63%	0%	31%	37%	100%	69%
78	64%	0%	30%	36%	100%	70%
79	53%	0%	32%	47%	100%	68%
80	71%	0%	33%	29%	100%	67%
81	62%	3%	29%	38%	97%	71%
82	65%	2%	25%	35%	98%	75%
83	58%	2%	28%	42%	98%	72%
84	64%	0%	27%	36%	100%	73%
85	62%	0%	19%	38%	100%	81%
86	62%	0%	17%	38%	100%	83%

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

The United States still produces more than 40 percent of the total world corn production (Table 1) with year-to-year variations associated with weather and government policies. Domestic feed use in the United States has fluctuated with prices and livestock inventory. Industrial use has shown steady growth (Table 4). Carryover stocks are often an important factor in the United States market with inventory levels 100 to 300 times those of Argentina. As a result, exports as a percent of total usage range from a low of 11 percent in 1970 to a high of 33 percent in 1980 (Table 3).

World market shares for Argentina and the United States show the United States gaining relative to Argentina during the 1970's, reaching an all-time high of 78.6 percent in 1980. Following the crop year of 1980/81, the United States lost market share to other exporting nations. Argentina continued to keep approximately 9 percent of the World market (Figure 1).

World markets were important to Argentine maize producers as early as the beginning of the twentieth century. Average annual maize exports from Argentina in the 1911/12 to 1913/14 period were 4.82 mmt, accounting for 54.9 percent of the world trade (Table 5). United States exports were small by comparison, with an annual average during this period of 1.21 mmt or 13.8 percent of world trade. During the next forty years, however, the trade balance began to shift. Between the 1951 to 1955 period and the 1976 to 1980 period, average Argentine maize exports increased from 0.92 mmt to 6.4 mmt, while the average U.S. maize exports increased from 2.6 mmt to 53.6 mmt. During that thirty-year period, Argentina's export market share decreased by 50 percent, dropping from 17.8 percent in the 1951 to 1956 period to 8.9 percent in the 1976 to 1980 period. In contrast, the U.S. export market share increased by 50 percent, growing from 50.6 percent in 1951 to 1955 to 74.5 percent in 1976 to 1980 (Table 5). Production and exports increased rapidly in both countries, but the United States continued to gain market share at the expense of Argentina. Throughout the decade of the 1970s, the U.S. market share increased from 40.9 percent in 1970/71 to 78.8 percent in 1979/80. In contrast, Argentina's share dropped from 20.5 percent in 1970/71 to 7.6 percent in 1979/80. However, Argentine market shares rebounded to 10.9 percent after the United States suspended grain sales to the USSR in January 1980. As a result of the grain embargo, the U.S. market share dropped to 71.5 percent in 1980/81 and to 69.5 percent in 1981/82. Both Argentina and the United States lost market shares in 1981/82 as a result of increased production and exports by both Thailand and South Africa.

The major Argentine ports for exporting maize are Buenos Aires, Rosario, Villa Constitucion, Bahia Blanca, and San Nicolas. Two ports handled 71.8 percent of the total exports in 1980/81: Buenos Aires handled 27.4 percent, Rosario handled 44.4 percent (Table 6). Both ports have generally lost their market share since 1970, declining from 80.0 percent in 1970/71 to 60.2 percent in 1984/85. Most other ports showed relative gains during this period, with especially dramatic increases in Bahia Blanca and San Nicolas. Years of large

Table 4. Production and Utilization of Corn in the United States, 1964-1986[1] (in 1,000 mt)[2]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Dom Feed	Dom Oth	Ttl Dom Use	End Stx	Local Mktg Year
64	22408	39.5	68512	39040	26	127578	14241	75344	8849	84193	29136	64/65
65	22417	46.5	104239	29136	22	133397	16738	86077	9181	95258	21379	65/66
66	23069	45.9	105887	21379	22	127288	12138	84792	9344	94136	20988	66/67
67	24563	50.3	123552	20988	23	144563	15546	89732	9506	99238	29685	67/68
68	22655	49.9	113048	29685	33	142766	13301	91253	9780	101033	28407	68/69
69	22086	53.9	119044	28407	27	147478	15549	96310	10098	106408	25533	69/70
70	23213	45.4	105387	25533	102	131022	12854	91303	10102	101405	16840	70/71
71	25920	55.3	143338	16840	32	160210	19868	101505	10190	111695	28600	71/72
72	23238	60.9	141519	28600	24	170143	31536	109478	11169	120647	18010	72/73
73	25050	57.3	143537	18010	25	161572	31242	106508	11457	117965	12269	73/74
74	26467	44.8	118572	12269	51	130892	28922	81056	11695	92751	9169	74/75
75	27357	54.2	148275	9169	51	157495	43459	91516	12446	103962	10160	75/76
76	28935	55.2	159721	10160	76	169957	42774	91669	13030	104699	22504	76/77
77	28976	57.0	165163	22504	70	187737	49479	96114	13995	110109	28219	77/78
78	29109	63.4	184551	28219	26	212796	54178	110947	14605	125552	33122	78/79
79	29300	68.9	201584	33122	26	234732	61798	114783	17149	131932	41073	79/80
80	29555	57.1	168759	41073	25	209857	59817	105131	18673	123804	35361	80/81
81	30159	68.4	206288	35361	28	241677	51043	105887	20250	126137	64432	81/82
82	29429	71.1	209240	64432	18	273690	46580	114830	22730	137560	89490	82/83
83	20835	50.9	106050	89490	69	195609	48300	96976	24764	121740	25561	83/84
84	29103	67.0	194990	25561	89	220640	47383	104541	26789	131330	41866	84/85
65	30442	74.1	225575	41866	279	267720	31523	104805	28678	133483	102618	85/86
86	28000	74.9	209720	102618	76	312414	28576	109225	29230	138455	145383	86/87

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[1] Data for 1980 and subsequent years is based on September-August year.

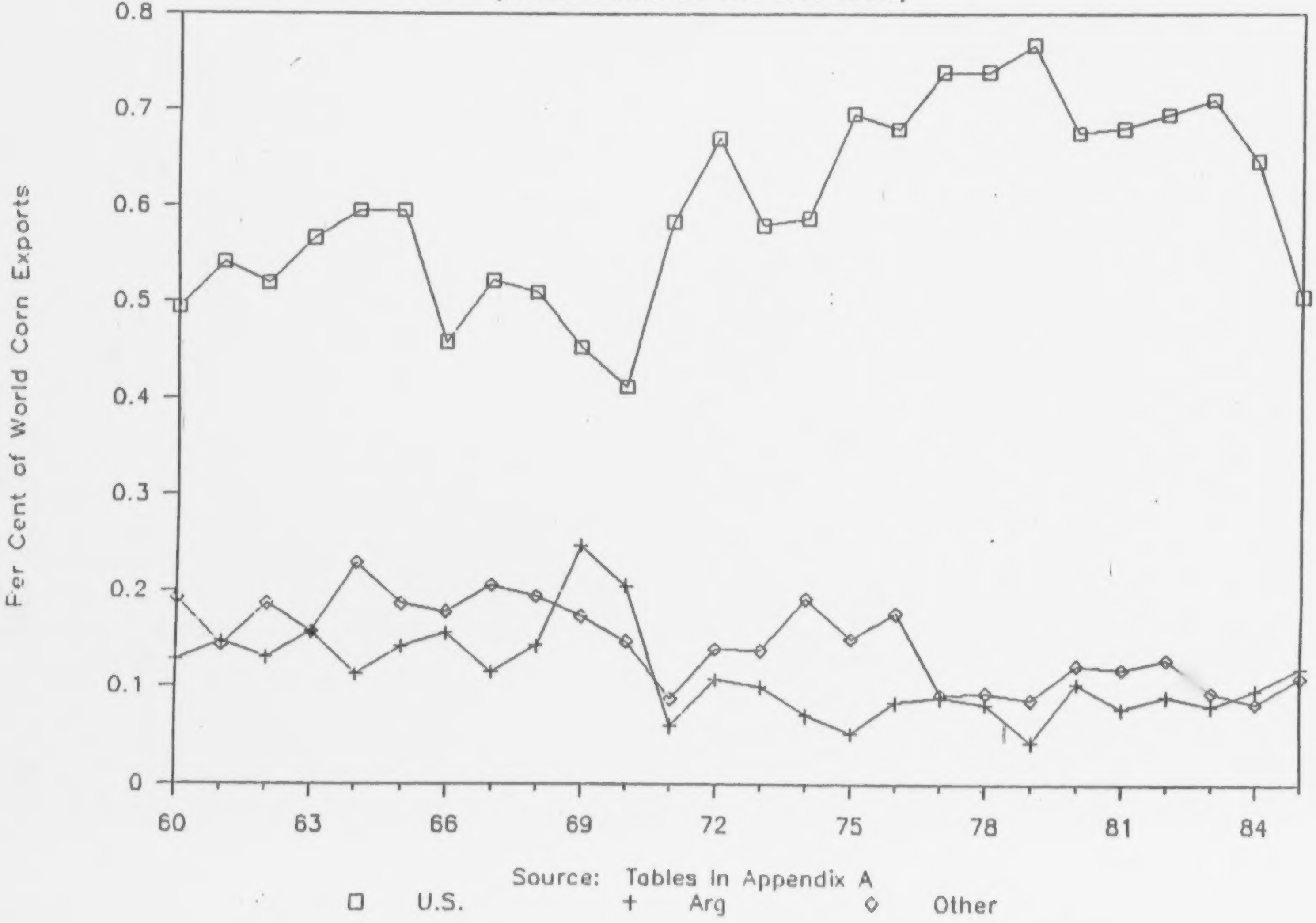
[2] Harvested acreage in 1,000 hectares; yields in quintals per hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

Figure 1.

WORLD CORN EXPORTERS' MARKET SHARES

(Includes Intra EC and Bloc Trade)



Source: Tables In Appendix A

Table 5. Annual Maize Exports for the United States, Argentina, and the World, and Comparison of Market Shares, 1911 through 1983/84

	Export Volume, (mmt)			Market Share (%)	
Year[1]	World[2]	Argentine	U.S.	Argentine	U.S.
1911-13 ave.	8.78	4.82	1.21	54.9	13.8
1951/52	4.478	.480	2.776	10.7	62.0
1952/53	4.666	.633	2.224	13.6	47.7
1953/54	5.609	1.150	3.603	20.5	64.2
1954/55	5.148	2.050	1.701	40.0	33.0
1955/56	5.817	.268	2.718	4.6	46.7
1951-55 ave.	5.144	.916	2.604	17.8	50.6
1956/57	6.643	1.206	2.885	18.2	43.4
1957/58	7.338	.793	4.233	10.8	57.7
1958/59	9.511	2.093	4.409	22.0	46.4
1959/60	9.960	2.728	5.288	27.4	53.1
1960/61	12.083	2.068	5.142	17.1	42.6
1956-60 ave.	9.107	1.778	4.391	19.5	48.2
1961/62	19.900	2.924	10.481	14.7	52.7
1962/63	20.001	2.614	10.069	13.1	50.3
1963/64	21.800	3.422	12.068	15.7	55.4
1964/65	23.900	2.667	14.240	11.2	59.6
1965/66	27.800	6.421	16.737	23.1	60.2
1961-65 ave.	22.680	3.610	12.719	15.9	56.1
1966/67	26.300	4.118	12.137	15.7	46.1
1967/68	29.000	3.229	15.546	11.1	53.6
1968/69	26.300	3.764	13.300	14.3	50.6
1969/70	30.900	5.558	15.548	18.0	50.3
1970/71	31.401	6.442	12.853	20.5	40.9
1966-70 ave.	28.780	4.622	13.877	16.1	48.2
1971/72	34.899	2.538	19.869	7.3	56.9
1972/73	44.501	4.702	31.536	10.6	70.9
1973/74	53.500	5,715	31.241	10.7	58.4
1974/75	46.299	3.485	29.186	7.5	63.0
1975/76	60.599	3.239	43.459	5.3	71.7
1971-75 ave.	47.960	3.936	31.058	8.2	64.8
1976/77	60.599	5.230	42.773	8.6	70.6
1977/78	66.099	5.916	49.479	9.0	74.9
1978/79	71.101	5.964	54.181	8.4	76.2
1979/80	78.399	5.957	61.801	7.6	78.8
1980/81	83.700	9.099	59.820	10.9	71.5
1976-80 ave.	71.980	6.433	53.611	8.9	74.5

Table 5. (Continued.) U.S. and Argentine Annual World Exports and Market Shares of Maize, 1911-1913 Average, and 1951/52 to 1983/84 annual.

	Export Volume (million metric tons)			Market Share (%)	
Year[1]	World[2]	Argentine	U.S.	Argentine	U.S.
1981/82	71.901	5.766	49.964	8.0	69.5
1982/83	66.899	6.056	47.501	9.1	71.0
1983/84[3]	66.099	5.999	48.260	9.1	73.0
1981-83 ave.	68.300	5.940	48.575	8.7	71.1

[1] Argentine crop years have been shifted forward one year to correspond with US marketing years, i.e. 1956/57 crop year for Argentina is recorded as 1957/58 marketing year.
[2] Includes intra-EC trade.
[3] Forecast as of August 13, 1984.

Sources: 1911-1913 data from 6, p. 289. 1951/52-1960/61 data: World and U.S. data from 25, pp. 125-134. Argentine data from 29, p. 35. 1961/62-1981/83 data from 23, pp. 48, 50: 1961/62-1978/79 are July/June years, thereafter October/September.
[6] Forecast as of August 13, 1984.

Table 6. Volume of Maize Exported From Argentina by Port of Origin, 1970-1985 (thousand tons)

Calendar Year	Buenos Aires	Rosario	Villa Constitucion	Bahia Blanca	San Nicolas	Quequen	Other Ports	Total
1970	1,956.7 (37.3)[1]	2,236.3 (42.7)	339.8 (6.5)	64.3 (1.2)	140.5 (2.7)	67.9 (1.3)	436.2 (8.3)	5,241.7 (100)
1971	2,378.3 (38.9)	2,524.5 (41.3)	492.1 (8.0)	66.0 (1.1)	152.5 (2.5)	28.1 (.46)	471.8 (7.7)	6,113.3 (100)
1972	1,164.1 (38.3)	1,373.3 (45.2)	279.7 (9.2)	1.5 (.05)	96.0 (3.2)	0.2 (.01)	124.4 (4.1)	3,039.2 (100)
1973	1,760.1 (40.7)	1,757.1 (40.6)	404.6 (9.4)	118.5 (2.7)	99.3 (2.3)	00.0 (0)	186.0 (4.3)	4,325.6 (100)
1974	1,985.5 (35.4)	1,808.7 (32.2)	544.7 (9.7)	376.0 (6.7)	209.6 (3.7)	44.9 (.80)	644.5 (11.5)	5,613.9 (100)
1975	1,640.5 (41.0)	1,311.5 (32.8)	338.1 (8.4)	207.6 (5.2)	197.8 (4.9)	14.1 (.40)	291.4 (7.3)	4,001.4 (100)
1976	1,374.7 (44.9)	880.3 (28.8)	302.0 (9.9)	191.5 (6.3)	137.3 (4.5)	10.0 (.30)	162.8 (5.3)	3,058.6 (100)
1977	2,090.5 (38.2)	1,990.4 (36.4)	683.4 (12.5)	249.5 (4.6)	67.0 (1.2)	49.1 (.90)	344.0 (6.3)	5,474.0 (100)
1973	2,127.0 (35.5)	1,908.2 (31.9)	960.8 (16.1)	331.3 (5.5)	289.9 (4.8)	58.1 (1.0)	309.3 (5.2)	5,984.5 (100)
1979	1,742.4 (29.2)	1,885.7 (31.6)	936.2 (15.7)	368.4 (6.2)	598.2 (10.0)	20.5 (.34)	412.7 (7.0)	5,964.1 (100)
1980	966.1 (27.4)	1,564.2 (44.4)	483.0 (13.7)	141.7 (4.0)	225.7 (6.4)	00.01 (0)	144.0 (4.1)	3,524.6 (100)

Table 6. (Continued) Volume of Maize Exported From Argentina by Port of Origin, 1970-1985 (thousand tons)

Year	Buenos Aires	Rosario	Villa Constitucion	Bahia Blanca	San Nicolas	Quequen	Other Ports	Total
1981	1,973.9 (21.7)	2,907.8 (31.9)	934.6 (10.3)	961.5 (10.6)	716.4 (7.9)	102.2 (1.1)	1,515.6 (16.6)	9,112.1 (100)
1982	1,302.8 (25.0)	1,599.4 (30.7)	585.8 (11.2)	354.9 (6.8)	382.7 (7.3)	00.0 (0)	988.7 (19.0)	5,214.2 (100)
1983	1,702.2 (26.3)	2,468.3 (38.1)	596.9 (9.2)	435.5 (6.7)	579.8 (9.0)	21.0 (.3)	672.7 (10.4)	6,476.5 (100)
1984	1,311.5 (23.6)	1,708.7 (30.7)	562.8 (10.1)	431.8 (7.8)	711.9 (12.8)	109.4 (2.0)	722.3 (13.0)	5,558.4 (100)
1985[2]	883.1 (17.7)	2,123.0 (42.5)	357.7 (7.2)	26.8 (.5)	565.2 (11.3)	43.0 (.9)	998.7 (20.0)	4,997.5 (100)

[1] Numbers in parentheses represent individual port's percentage of total export volume.
[2] 1985 data includes data for January through July.

Sources: 1970-1981 data from 12, p. 74; 1982-1985 data from 19 exports from Argentina tend to benefit the minor ports, as capacity constraints limit volume at Buenos Aires and Rosario during high-volume periods.

A major explosion at the export elevator in Bahia Blanca in 1985 caused a drop in its market share from nearly 8 percent in 1984/85 to only 0.5 percent in the first six months of 1986. Italy and the Soviet Union have agreed to help remodel the Bahia Blanca port to double its grain-handling capacity to 12 mmt. This higher volume would also require the reorganization of rail facilities and the modernization of assembly and discharging operations which may shift the relative shares among the ports as well as alter the relative profitability and production of maize in the hinterland serving the Bahia Blanca port.

The destination of Argentine exports has shifted over time in response to economic incentives and government policies affecting international trade. In 1973/74 Italy and Spain received 65.9 percent of all maize exported from Argentina (Table 7). The Netherlands, United Kingdom, People's Republic of China, and USSR were also important destinations, each receiving from 2.3 to 4.9 percent of Argentine exports.

Major shifts in destinations occurred between 1973/74 and 1974/75. The percentage going to the USSR increased to 19.7 percent, Mexico entered the market taking 12.4 percent, and the People's Republic of China purchased 473,000 tons for 8.1 percent of the market. Over the next two years the USSR dropped to 4.2 percent, Mexico to 0.6 percent and the People's Republic of China to zero. Spain increased its share, receiving more than one-fourth of Argentina's exports of maize in 1976/77.

From 1974/75 to 1979/80 there was a general downtrend in the share of Argentine maize exports delivered to Mexico, Spain, and Italy. The Italian preference for Argentine La Plata maize appeared to be weakening throughout this period, as evidenced by their declining share. The major exception was in 1975/76, when Italy maintained purchases of 1.5 mmt in the face of a major decline in Argentine exports: from 5.8 mmt in 1974/75 to only 2.6 mmt in 1975/76 (Table 7). In contrast, the USSR share grew erratically, fluctuating from a low of 4.2 percent in 1976/77 to 60.6 percent in 1979/80. The rapid growth of the USSR share in the late 70s prepared the stage for the near Soviet dominance of Argentine exports in the early 80s.

In late 1980 and early 1981, political events dramatically altered the destinations of Argentine maize exports. After the 1980 invasion of Afghanistan by the USSR, the United States responded by suspending American grain sales to the Soviet Union. Consequently, Argentine shipments to the USSR increased to 2.97 mmt in 1980/81 and jumped to 8.0 mmt in 1981/82 (84.1 and 87.7 percent of Argentine exports, respectively). Shipments to the United Kingdom had already dropped to nearly zero in calendar years 1980 and 1981 as a result of the price premium being paid by USSR, but the Falkland Island incident, starting April 2, 1982, resulted in a "total ban on imports

Table 7. Argentine corn exports by country of destination, 1975/76-1985
(in 1,000 t/% of total)

Year	Italy	Spain	USSR	Netherlands	United Kingdom	Mexico	Peoples Rep. of China	Total Argentine Exports
1973/74[2]	2,772 (54.2)	600 (11.7)	246 (4.8)	115 (2.3)	120 (2.3)	1 (0.02)	252 (4.9)	5,111
1974/75	2,056 (35.3)	556 (9.5)	1,148 (19.7)	59 (1.0)	5 (.09)	723 (12.4)	473 (8.1)	5,831
1975/76	1,520 (58.6)	225 (8.7)	213 (8.2)	68 (2.6)	1 (.04)	289 (11.1)	-- (0)	2,595
1976/77	1,893 (43.2)	1,109 (25.3)	184 (4.2)	126 (2.9)	133 (3.0)	25 (0.6)	-- (0)	4,384
1977/78	1,381 (23.0)	1,069 (17.8)	1,608 (26.8)	142 (2.4)	94 (1.6)	48 (0.8)	59 (1.0)	5,997
1978/79	1,838 (27.6)	1,573 (23.6)	1,387 (20.8)	147 (2.2)	53 (.8)	21 (0.3)	131 (2.0)	6,664
1979/80	709 (17.5)	314 (7.7)	2,461 (60.6)	55 (1.4)	21 (.51)	-- (0)	-- (0)	4,060
1980[2]	328 (9.3)	1 (0.4)	2,965 (84.1)	74 (2.1)	-- (0)	-- (0)	-- (0)	3,525
1981	300 (3.3)	225 (2.5)	7,989 (87.7)	98 (1.1)	-- (0)	-- (0)	-- (0)	9,112
1982	227 (4.4)	397 (7.6)	3,301 (63.3)	92 (1.8)	-- (0)	-- (0)	132 (2.5)	5,214

Table 7. (Continued) Argentine corn exports by country of destination, 1975/76-1985
(in 1,000 t/% of total)

Year	Italy	Spain	USSR	Netherlands	United Kingdom	Mexico	Peoples Rep. of China	Total Argentine Exports
1983	395 (6.1)	697 (10.8)	2,002 (30.9)	102 (1.6)	-- (0)	-- (0)	49 (0.8)	6,477
1984	335 (6.0)	591 (10.6)	1,090 (19.6)	62 (1.1)	-- (0)	-- (0)	-- (0)	5,558
1985	502 (7.1)	956.4 (13.6)	2,038.7 (29.0)	107.4 (1.5)	-- (0)	197.4 (2.7)	-- (0)	3,238.2 7,040.8

[1] Market shares are in parentheses--indicates volume less than 1000 mt.
[2] 1980-1985 reporting period has been shifted to a calendar year.

Sources: 1973/74 - 1979/80 data from 27 and 28. Data for 1980-85 are from government publications (19). Estimates vary by source. So do the time periods used for crop years, marketing years, and calendar years. No consistent sources were found that covered the entire period.

from Argentina" on April 10, 1982, and the UK share of Argentine maize exports remained at zero through 1984. Shipments to Spain and Italy continued to drop, with especially dramatic decreases in 1980 and 1981 (Table 8) as the price premiums offered by the USSR directed the export flow away from Western Europe. Resumption of normal grain trade between the United States and the USSR reduced Argentine exports to the USSR in 1982, 1983, and 1984, but price relationships shifted the flow back to the USSR in 1985. Spain and Italy also regained some of their former relative importance in 1985.

The United States and Argentina share the same trading partners, especially countries in Western Europe, USSR, and Mexico. When U.S. exports to USSR dropped to 5 mmt in 1980/81, Argentine exports rose from 3 mmt to 8 mmt. The strong downtrend in U.S. exports to Europe is offset by an increased proportion to Japan and Taiwan, and a fluctuating proportion to USSR (Table 8).

Soybeans and Soybean Meal

The United States dominates world production of raw soybeans, accounting for about 60 percent of total world production (Table 9). Other major producers in 1986/87 were Brazil (17%), Argentina (7.5%), and PRC (11%). United States production of 19.1 mmt in 1964 makes the Argentine production of 17,000 mt insignificant in world trade. (Appendix A, Tables 1, 4, 5) Both countries made dramatic increases in the next twenty years. The United States increased production from 19.1 mmt in 1964 to 54.7 mmt in 1986, an increase of 286.7 percent in this 23 year period. During this same period, Argentina increased production from 17,000 mt to 7,702,000, a 453 fold increase.

Exports of soybeans follow a different pattern than production. Argentina reported no exports of soybeans through 1975. Their volume increased rapidly over the next four years and then stabilized at about 2 to 3 mmt (Appendix A, Table 1). The exports of soybeans from the United States increased steadily through 1981. From 1981 through 1986 exports fluctuated from 16.3 mmt to 25.3 mmt (Appendix A, Table 5).

Unlike the United States, Argentina exports a high proportion of its meal and oil -- 93 and 87 percent respectively. U.S. exports of meal and oil represent 23 and 10 percent of usage respectively (Table 10).

In both countries, the percent of supply processed annually followed a similar pattern up through 1971 with total crush ranging from 12 to 35 percent in Argentina and 48 to 62 percent in the United States (Table 11).

Argentine meal exports increased rapidly between 1965 and 1984, capturing 12.7 percent of the world market. Their market share is relatively stable after 1984 (Table 12).

The shifts in market shares can also be demonstrated by converting the exports of meal and soybeans to the meal equivalent.

Table 8. United States corn exports by country of destination, 1975/76-1985-86

(in 1,000 mt/% of total)

Year	Japan	W. Europe	USSR	Mexico	S. Korea	Taiwan	Others	Total
1975/76	5,784	17,420	10,517	996	777	797	6,835	43,126
	(13.4)	(40.4)	(24.4)	(2.3)	(1.8)	(1.8)	(15.8)	
1976/77	7,639	21,180	2,910	1,438	1,205	1,180	6,902	42,454
	(18.0)	(49.9)	(6.9)	(3.4)	(2.8)	(2.8)	(16.3)	
1977/78	8,608	15,572	10,458	1,723	1,761	1,489	9,497	49,108
	(17.5)	(31.7)	(21.3)	(3.5)	(3.6)	(3.0)	(19.3)	
1978/79	8,977	13,739	9,849	628	2,671	2,155	15,866	53,885
	(16.7)	(25.5)	(18.3)	(1.2)	(5.0)	(4.0)	(29.4)	
1979/80	11,193	15,550	5,342	3,870	2,130	2,113	21,219	61,417
	(18.2)	(25.3)	(8.7)	(6.3)	(3.5)	(3.4)	(34.5)	
1980/81	12,586	14,568	4,947	3,832	2,304	1,502	19,629	59,368
	(21.2)	(24.5)	(8.3)	(6.5)	(3.9)	(2.5)	(33.1)	
1981/82	10,588	15,377	7,499	554	2,690	1,718	11,183	49,609
	(21.3)	(31.0)	(15.1)	(1.1)	(5.4)	(3.5)	(22.5)	
1982/83	13,179	9,584	3,159	3,987	3,904	3,000	10,292	47,105
	(28.0)	(20.3)	(6.7)	(8.5)	(8.3)	(6.4)	(21.8)	
1983/84	13,775	8,354	6,500	2,807	2,971	2,694	9,900	47,001
	(29.3)	(17.8)	(13.8)	(6.0)	(6.3)	(5.7)	(21.1)	
1984/85	11,165	6,608	15,058	1,401	1,453	3,080	7,630	46,395
	(24.1)	(14.2)	(32.5)	(3.0)	(3.1)	(6.6)	(16.4)	
1985/86	9,313	3,114	6,685	1,640	1,331	2,584	6,464	31,131
	(29.9)	(10.0)	(21.5)	(5.3)	(4.3)	(8.3)	(20.8)	

Sources: 1975/76-1982/83: USDA - ERS. U.S. Foreign Agricultural Trade Statistical Report. Various issues. 1983/84-1985/86: USDA-ERS. Foreign Agricultural Trade of the United States, Fiscal Year Supplement. Various issues.

Table 9. Production and export of soybeans as a share of world totals - United States, Brazil, and Argentina, 1970-1986/87.

World Production Shares (in %)

	1986/87[1]	1985/86[2]	1984/85	1984	1983	1982	1981	1980	1975	1970
United States	54.6	59.1	54.4	56.3	56.1	66.6	61.5	60.3	55.6	65.9
Brazil	17.0	14.4	19.6	17.3	18.4	13.8	16.9	18.7	17.8	3.2
Argentina	7.5	7.5	7.3	7.5	5.0	4.3	4.3	4.3	1.1	<0.1

World Export Shares (in %)

	1986/87[1]	1985/86[2]	1984/85	1984	1983	1982	1981	1980	1975	1970
United States	72.2	77.4	64.5	77.0	85.5	88.3	83.4	81.0	75.9	93.7
Brazil	9.5	4.6	13.8	6.1	4.9	1.7	5.5	5.8	20.3	2.3
Argentina	9.5	9.8	13.0	12.1	5.4	6.5	8.5	10.0	<0.1	n.a.

[1] As of May 1987

[2] Preliminary

Sources: 1965-1984: FAO Production Yearbook, Various years, Rome, FAO Trade Yearbook, Various years, Rome

1984/85-1986/87: USDA-FAS. World Oilseed Situation and Market Highlights. Circular Series FOP 5-87, May 1987.

Table 10. Exports of Soybeans as a Share of Respective Domestic Supplies - United States, Brazil, and Argentina, 1965-1986 (in %)

	Percent of Usage Exported as Soybeans			Percent of Meal Usage Exported			Percent of Oil Usage Exported		
Mktg Year	Arg	Brazil	U.S.	Arg	Brazil	U.S.	Arg	Brazil	U.S.
1965	0%	18%	29%	0%	62%	18%	0%	0%	25%
1966	0%	21%	30%	0%	77%	20%	0%	0%	16%
1967	0%	38%	30%	0%	46%	20%	0%	0%	18%
1968	0%	11%	30%	0%	71%	21%	0%	0%	16%
1969	0%	29%	30%	0%	75%	21%	0%	0%	13%
1970	0%	21%	35%	0%	85%	23%	0%	2%	18%
1971	0%	10%	34%	0%	84%	25%	0%	2%	22%
1972	0%	29%	35%	0%	96%	22%	0%	10%	18%
1973	0%	36%	37%	9%	68%	28%	81%	16%	14%
1974	0%	37%	38%	6%	72%	29%	70%	2%	16%
1975	0%	36%	35%	37%	81%	26%	23%	31%	14%
1976	16%	32%	37%	66%	83%	25%	79%	35%	11%
1977	46%	21%	39%	70%	81%	24%	66%	35%	17%
1978	69%	6%	41%	70%	79%	27%	53%	32%	20%
1979	77%	6%	40%	52%	72%	27%	96%	26%	21%
1980	75%	10%	42%	50%	73%	29%	78%	35%	23%
1981	63%	9%	39%	71%	79%	28%	45%	45%	15%
1982	50%	6%	45%	92%	80%	28%	73%	37%	18%
1983	34%	9%	43%	94%	79%	27%	80%	38%	17%
1984	44%	10%	41%	93%	80%	23%	97%	37%	16%
1985	44%	19%	35%	92%	80%	20%	92%	37%	14%
1986	35%	8%	39%	92%	73%	24%	87%	16%	11%
1987	34%	11%	39%	93%	74%	23%	87%	22%	10%

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights. Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

Table 11. Volume of soybeans processed as a percent of total domestic supplies - United States, Brazil and Argentina, 1964-1987.
(in %)

Year	United States	Argentina	Brazil
1964	62.3	N/A	N/A
1965	61.4	35.3	48.7
1966	58.0	17.9	51.4
1967	54.0	11.9	46.6
1968	47.5	19.3	61.9
1969	50.5	19.7	51.3
1970	56.0	24.7	56.5
1971	56.5	30.3	72.8
1972	53.8	29.9	56.1
1973	51.1	53.6	51.2
1974	50.5	44.6	52.7
1975	49.8	66.8	53.6
1976	51.5	54.3	54.0
1977	49.5	36.0	62.4
1978	50.1	23.0	77.7
1979	46.1	16.6	78.8
1980	47.3	18.8	78.6
1981	44.7	29.2	80.1
1982	45.3	43.5	84.2
1983	49.6	55.7	83.2
1984	50.6	49.4	78.6
1985	43.6	49.0	71.1
1986	42.4	58.6	80.7
1987	N/A	59.3	79.6

Sources: Calculated from Appendix Tables

Table 12. Market shares of world soybean meal[1] exports - United States, Brazil and Argentina, 1965-1986/87
(in %)

	1986/ 87[2]	1985/ 86[3]	1984/ 85	1984	1983	1982	1981	1980	1975	1970	1965
U.S.	25.5	24.1	20.0	22.0	28.4	30.9	31.6	39.4	42.3	68.0	70.2
Brazil	34.0	32.4	37.9	37.4	37.1	39.5	44.3	37.0	35.1	9.8	3.7
Argentina	13.9	13.9	12.9	12.7	6.9	4.9	2.6	1.6	1.6	N/A	N/A

[1] 1965-1985 soybean cake and meal
[2] as of May 1987
[3] preliminary

Sources: 1965-1984: FAO Trade Yearbook, various years, Rome.
1984/85-1986/87: USDA-FAS. World Oilseed Situation and Market Highlights. Circular series FOP 5-87, May 1987.

Table 13. Market shares of world soybean and soybean meal[1] exports in meal equivalent - United States, Brazil and Argentina, 1970-1986/87
(in %)

	1986/87[2]	1985/86[3]	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	53.1	55.6	46.2	55.1	69.2	67.8	63.8	66.7	65.8	87.3
Brazil	19.5	16.0	23.7	18.1	16.6	15.1	20.2	16.5	24.7	4.2
Argentina	11.3	11.5	13.0	12.3	5.6	5.9	6.2	7.1	0.5	N/A

[1] For 1970-1984
[2] May
[3] Preliminary

Sources: 1965-1984: FAO Trade Yearbook, various years, Rome.
1984/85-1986/87: USDA-FAS. World Oilseed Situation and Market Highlights. Circular series FOP 5-87, May 1987.

Assuming a constant conversion of 0.79 tons of meal from every ton of raw beans provides a market share comparison that is independent of domestic vs. foreign processing allocation. The United States is the dominant force in world markets with just over 1/2 of world exports.

Destinations of soybean and soybean meal exports reveal competition for the same major markets by both countries. Western Europe has been a major market, accounting for 44.9 percent of U.S.' exports of raw beans in 1985/86, and 59.5 of Argentina's (Table 14). Argentina has larger and more stable flows to USSR than either United States or Brazil. Japan accounts for a very small and intermittent proportion of the Argentine exports but is a large and stable customer for U.S. soybeans.

In the case of soybean meal exports, Western Europe provides the largest market for both exporting countries. East European countries are of almost no importance as a destination for United States and Argentine exports. Direct and vigorous competition for meal markets is most evident in Western Europe. Secondary markets for each country have little overlap (Table 15).

Wheat

Wheat production in Brazil and Argentina has been small compared to production in the United States, but the rate of increase between 1970 and 1986 has been much greater. Argentine wheat production has ranged from a low of 4.9 mmt in 1970 to a high of 15.0 mmt in 1982 (Table 16). Because of the extreme variability in production, Argentina has frequently been an importer as well as an exporter of wheat. Exports have also been quite variable, ranging from a low of 1.0 mmt in 1970 to a high of 9.9 mmt in 1982. In three of the past five years, Argentine exports have exceeded 7 mmt (Table 16). Argentina's share of world wheat exports has ranged from 2.6 to 9.2 percent since 1970 with a recent drop following earlier increases. The U.S. share during that period declined slightly from about 46 percent in 1975 to about 30 percent in 1986/87 with increases in the mid-1980's (Table 17).

Destinations of wheat exports from Argentina and the United States show a degree of market segmentation, rather than direct competition (Table 18).

Japan is a major customer for U.S. wheat exports taking as much as 12.4 percent; they are included in "other" for Argentina. The USSR has been receiving 39 to 81 percent of Argentine exports; generally less than 10 percent of U.S. exports. Only in Brazil's purchases is there evidence of strong competition with both Argentina and United States exporting 2 to 10 percent of their production to Brazil. Argentina's loss of the European market (from 438,000 mt in 1976/77 to near zero in the early 1980's) reflects the increased wheat production in W. Europe but may also relate to the shift to a low protein spring wheat in the production areas in Argentina. The decline in Durum wheat in Argentina has shifted their customers to those desiring low protein, semi-hard spring wheat. This is the case of Bolivia, Peru and Iran, all showing increased imports in the mid 1980's.

Table 14. Major Destinations of Soybeans Exported from the United States and Argentina, 1975/76 to 1985/86[1]

(in 1,000 mt/% of total)

United States

Dest. Year	W. Europe	Japan	Taiwan	USSR	Mexico	S. Korea	Others	Total
1975/76	8,899 (59.1)	3,248 (21.6)	789 (5.2)	310 (2.1)	13 (0.1)	99 (0.7)	1,692 (11.2)	15,050
1976/77	8,391 (55.4)	3,070 (20.3)	731 (4.8)	825 (5.4)	399 (2.6)	154 (1.0)	1,585 (10.5)	15,155
1977/78	10,997 (55.9)	3,798 (19.3)	927 (4.7)	744 (3.8)	580 (2.9)	248 (1.3)	1,392 (12.2)	19,686
1978/79	10,581 (52.4)	3,884 (19.2)	142 (0.7)	1,178 (5.8)	575 (2.8)	439 (2.2)	3,395 (16.8)	20,194
1979/80	13,276 (55.7)	3,877 (16.3)	810 (3.4)	813 (3.4)	845 (3.5)	473 (2.0)	3,739 (15.7)	23,833
1980/81	10,646 (53.3)	3,849 (19.3)	1,043 (5.2)	0 (0)	855 (4.3)	467 (2.3)	3,112 (15.6)	19,972
1981/82	15,731 (61.7)	4,184 (16.4)	1,050 (4.1)	683 (2.7)	334 (1.3)	552 (2.2)	2,943 (11.6)	25,477
1982/83	13,910 (56.7)	4,679 (19.1)	1,403 (5.7)	199 (0.8)	901 (3.7)	701 (2.9)	2,729 (11.1)	24,522
1983/84	9,055 (47.2)	4,234 (22.1)	1,316 (6.9)	416 (2.2)	1,303 (6.8)	707 (3.7)	2,167 (11.3)	19,198
1984/85	7,642 (46.0)	4,115) (24.8)	1,392 (8.4)	0 (0)	1,165 (7.0)	714 (4.3)	1,593 (9.6)	16,621
1985/86	9,050 (44.9)	4,290 (21.3)	1,506 (7.5)	1,519 (7.5)	860 (4.3)	954 (4.7)	1,960 (9.7)	20,139

[1] U.S. fiscal years = October-September; Argentina = April-March

[2] Incl. "n.a."

[3] 1975/76 "exports" were less than 1,000 mt. No single data available.

Sources: U.S.: 1975/76-1982/83: USDA-ERS, U.S. Foreign Agricultural Trade Statistical Report, Fiscal Years, Various Issues - 1983/84-1985/86: USDA-ERS, Foreign Agricultural Trade of the United States, Fiscal Years, Various issues.

Table 14. (continued) Major Destinations of Soybeans Exported from the United States and Argentina, 1975/76 to 1985/86[1]

(in 1,000 mt/% of total)

Argentina

Dest. Year	W. Europe	Japan	China	USSR	Mexico	Brazil	Others[2]	Total
1976/77	111 (100)	n.a.	n.a.	--- (0)	n.a.	n.a.	0 (0)	111
1977/78	484 (77.7)	n.a.	n.a	--- (0)	n.a.	n.a.	139 (22.3)	623
1978/79	1,534 (77.9)	n.a.	n.a.	33 (1.7)	n.a.	n.a.	402 (20.4)	1,969
1979	2,463 (87.7)	14 (0.5)	102 (3.6)	--- (0)	18 (0.6)	63 (2.2)	150 (5.3)	2,810
1980	1,608 (59.3)	16 (0.6)	--- (0)	747 (27.6)	--- (0)	247 (9.1)	91 (3.4)	2,709
1981	782 (35.4)	22 (1.0)	81 (3.7)	717 (32.5)	274 (12.4)	266 (12.1)	65 (2.9)	2,207
1982	488 (25.4)	--- (0)	53 (2.8)	716 (37.2)	122 (6.3)	515 (26.8)	29 (1.5)	1,923
1983	729 (51.4)	--- (0)	--- (0)	636 (44.8)	--- (0)	--- (0)	54 (3.8)	1,419
1984	2,297 (74.1)	--- (0)	--- (0)	149 (4.8)	105 (3.4)	157 (5.1)	392 (12.6)	3,100
1985	1,779 (59.5)	32 (1.1)	--- (0)	454 (15.2)	297 (9.9)	--- (0)	425 (14.2)	2,987

[1] U.S. fiscal years = October-September; Argentina = April-March

[2] Incl. "n.a."

[3] 1975/76 "exports" were less than 1,000 mt. No single data available.

Sources: Argentina: 1976/77-1978/79: JNG, Anuario 1981. 1979-1985: Colsa de Cereales de B.A. Numero Estadistico 1986.

Table 15. Major destinations of soybean meal[1] exported from the United States, and Argentina, 1975/76-1985/86[2]
(in 1,000 mt/% of total)

United States

Year	W.Europe	Canada	Venezuela	Poland	Mexico	Japan	Other[3]	Total
1975/76	3,077	278	84	361	7	120	740	4,667
	(65.9)	(6.0)	(1.8)	(7.7)	(0.1)	(2.6)	(15.9)	-
1976/77	2,521	329	128	257	190	217	548	4,190
	(60.2)	(7.9)	(3.1)	(6.1)	(4.5)	(5.2)	(13.1)	-
1977/78	3,284	339	114	493	95	271	920	5,516
	(59.5)	(6.1)	(2.1)	(8.9)	(1.7)	(4.9)	(16.7)	-
1978/79	3,342	414	244	243	91	204	1,458	5,996
	(55.7)	(6.9)	(4.1)	(4.1)	(1.5)	(3.4)	(24.3)	-
1979/80	4,029	356	329	400	148	210	1,703	7,175
	(56.2)	(5.0)	(4.6)	(5.6)	(2.1)	(2.9)	(23.7)	-
1980/81	3,294	331	374	312	187	154	1,497	6,149
	(53.6)	(5.4)	(6.1)	(5.1)	(3.0)	(2.5)	(24.3)	-
1981/82	4,134	340	518	N/A	33	N/A	1,241	6,266
	(66.0)	(5.4)	(8.3)	-	(0.5)	-	(19.8)	-
1982/83	4,281	401	464	N/A	203	N/A	1,100	6,449
	(66.4)	(6.2)	(7.2)	-	(3.1)	-	(17.1)	-
1983/84	2,469	428	527	278	69	8	1,152	4.931
	(50.1)	(8.7)	(10.7)	(5.6)	(1.4)	(0.2)	(23.4)	-
1984/85	1,764	490	686	117	106	4	1,290	4,457
	(39.6)	(11.0)	(15.4)	(2.6)	(2.4)	(0.1)	(289)	-
1985/86	2,643	607	543	0	81	46	1,530	5,450
	(48.5)	(11.1)	(10.0)	0	(1.5)	(0.8)	(28.1)	

[1] figures prior to 1981/82 are oilcake and meal - soybeans
[2] U.S. fiscal years = October-September.
[3] incl. "n.a."

Sources: U.S.: 1975/76-1982-83: USDA-ERS. U.S. Foreign Agriculture Trade Statistical Report, Fiscal Year, various issues. 1983/84-1985/86: USDA-ERS. Foreign Agricultural Trade of the United States, Fiscal Year, various issues.

Table 15. (continued) Major destinations of soybean meal[1] exported from the United States, and Argentina, 1975/76-1985/86[2]
(in 1,000 mt/% of total)

ARGENTINA

Year	W.Europe	Bulgaria	Cechosl.	Cuba	Tunisia	Iran	Other	Total
1975/	130	N/A	N/A	14	N/A	N/A	14	158
1976	(82.3)	---	---	(8.9)	---	---	(8.9)	
1976/	134	N/A	N.A	54)	N/A	N/A	63	251
1977	(53.4)	---	---	(21.5)	---	---	(25.1)	
1977/	235	N/A	N/A	23	N/A	N/A	67	325
1978	(72.3)	---	---	(7.1)	---	---	(20.6)	
1978/	150	N/A	N/A	15	N/A	N/A	84	249
1979	(60.2)	---	---	(6.0)	---	---	(33.7)	
1979	250	33	---	41	18	---	5	347
	(72.0)	(9.5)	(0)	(11.8)	(5.2)	(0)	(1.4)	
1980	157	---	---	84	47	---	2	290
	(54.1)	(0)	(0)	(29.0)	(16.2)	(0)	(0.7)	
1981	383	---	---	86	---	---	47	516
	(74.2)	(0)	(0)	(16.7)	(0)	(0)	(9.1)	
1982	676	---	112	85	16	43	30	962
	(70.3)	(0)	(11.6)	(8.8)	(1.7)	(4.5)	(3.1)	
1983	848	105	75	157	19	299	33	1,536
	(55.2)	(6.8)	(4.9)	(10.2)	(1.2)	(19.5)	(2.1)	
1984	1312	100	311	191	81	211	60	2,266
	(57.9	(4.4)	(13.7)	(8.4)	(3.6)	(9.3)	(2.6)	
1985	1457	286	236	163	56	141	13	2,352
	(61.9)	(12.2)	(10.0)	(6.9)	(2.4)	(6.0)	(.6)	

[1] figures prior to 1981/82 are oilcake and meal - soybeans
[2] U.S. fiscal years = October-September.
[3] incl. "n.a."

SOURCES: Argentina: 1975/76-1978/79: JNG, Anuerio 1981.
1979-1985: Bolsa de Cereales de Buenos Aires. Numero Estadistico 1986.

Table 16. Production and Export of Wheat in the United States, and Argentina, 1970-1986.

(in mmt/% of total)

Year	U.S. Prod.	U.S. Exp.	(%)	Argentina Prod.	Argentina Exp.	(%)
1970	36.8	19.8	(54)[1]	4.9	1.0	(20)
1971	44.0	16.3	(37)	5.7	1.6	(28)
1972	42.1	30.4	(72)	6.9	3.2	(46)
1973	46.5	32.9	(71)	6.6	1.6	(24)
1974	48.8	27.4	(56)	6.0	1.8	(30)
1975	57.9	31.9	(55)	8.6	3.2	(37)
1976	58.5	25.9	(44)	10.9	5.9	(54)
1977	55.6	30.6	(55)	5.7	1.8	(32)
1978	48.2	32.5	(67)	8.1	4.1	(51)
1979	58.1	37.4	(64)	8.1	4.8	(59)
1980	64.6	41.2	(64)	7.8	3.8	(49)
1981	75.7	48.2	(64)	8.2	3.6	(44)
1982	75.4	41.1	(55)	15.0	9.9	(66)
1983	65.8	38.9	(59)	12.7	7.8	(61)
1984	70.7	38.8	(55)	13.2	9.4	(71)
1985	66.0	24.9	(38)	8.5	4.3	(51)
1986	56.7	26.5	(47)	9.2	4.7	(51)

1) Numbers in parenthesis denote the percentage of production used for exports.

SOURCES: Calculation from tables in Appendix A.

Table 17. Market shares of world wheat[1] exports, United States and Argentina, 1970-1986/87

(in %)

Country	1986/87	1985/86	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	31.2	29.4	35.6	37.4	36.7	39.8	42.8	37.1	45.8	33.4
Argentina	5.0	7.2	7.5	6.3	9.2	3.7	3.6	4.6	2.6	4.2

1) 1970-1984 Wheat and Wheat Flour, in Wheat equivalent.

SOURCES: 1970-1984: FAO Production Yearbook, various years, Rome: FAO Trade Yearbook, various years, Rome.

1984/85-1986/87: USDA-FAS, World Grain Situation and OUtlook, Circular Series FG-6-87, May 1987.

Table 18. Major destinations of wheat exported from the United States and Argentina, 1975/76 to 1985/86[1]

United States

Dest. Year	USSR	Japan	PR China	W. Europe	S. Korea	Egypt	Others	Total
1975/76	3,046	3,264	N.A.	2,547	1,801	1,116	15,592	29,874
	(10.2)	(10.9)	---	(8.5)	(6.0)	(3.7)	(53.4)	
1976/77	3,008	3,365	0	1,192	1,970	1,466	12,249	23,766
	(12.7)	(14.2)		(5.0)	(8.3)	(6.2)	(51.5)	
1977/78	3,414	3,175	914	2,534	1,629	1,274	16,179	31,812
	(10.7)	(10.0)	(2.9)	(8.0)	(5.1)	(4.0)	(50.9)	
1978/79	3,841	3,337	2,454	2,534	1,679	1,081	14,751	31,340
	(12.3)	(10.6)	(7.8)	(8.1)	(5.4)	(3.4)	(47.1)	
1979/80	2,262	3,266	4,036	3,148	1,756	1,218	18,436	35,066
	(6.3)	(19.1)	(11.2)	(8.7)	(4.9)	(3.4)	(51.1)	
1980/81	3,693	3,415	7,693	2,743	2,060	1,918	17,869	42,246
	(8.7)	(8.1)	(18.2)	(6.5)	(4.9)	(4.5)	(42.3)	
1981/82	5,975	3,317	8,107	3,915	1,930	2,032	16,535	44,607
	(13.4)	(7.4)	(18.2)	(8.8)	(4.3)	(4.6)	(37.1)	
1982/83	2,980	3,389	1,921	2,327	1,844	1,897	20,156	36,701
	(8.1)	(9.2)	(5.2)	(6.3)	(5.0)	(5.2)	(54.9)	
1983/84	7,566	3,449	4,579	2,158	1,985	1,589	18,045	41,698
	(18.1)	(8.3)	(11.0)	(5.2)	(4.8)	(3.8)	(43.3)	
1984/85	2,852	3,254	1,373	1,735	1,901	1,030	13,491	28,523
	(10.0)	(11.4)	(4.8)	(6.1)	(6.7)	(3,6)	(47.3	
1985/86	153	3,170	142	1,470	2,059	2,569	15,516	25,496
	(0.6)	(12.4)	(0.6)	(5.8)	(8.1)	(10.1)	(60.9)	

1) U.S. Fiscal years = October - September; Argentina = December - November.
2) Bread Wheat only.
3) Including "N/A".

SOURCES: U.S.: 1975/76 - 1982/83: USDA-ERS. U.S. Foreign Agricultural Trade Statistical Report, Fiscal Year, various issues.
1983/84 - 1985/86: USDA-ERS. Foreign Agricultural Trade of United States, Fiscal Year Supplement, various issues.

Table 18. (continued) Major destinations of wheat exported from the United States and Argentina, 1975/76 to 1985/86[1]

Argentina[2]

Year	USSR	P.R. China	W. Europe	Brazil	Bolivia	Peru	Iran	Others[3]	Total
1975/76	940 (32.2)	N/A	299 (10.3)	690 (23.6)	34 (1.1)	181 (6.2)	N/A	779 (26.7)	2,923
1976/77	100 (1.8)	N/A	438 (08.0)	933 (17.1)	51 (0.9)	282 (5.2)	N/A	3,644 (66.9)	5,448
1977/78	1,123 (75.2)	N/A	27 (1.8)	28 (1.8)	43 (2.9)	106 (7.1)	N/A	166 (11.1)	1,493
1978/79	109 (2.8)	N/A	141 (3.7)	1,377 (35.7)	63 (1.6)	303 (7.9)	N/A	1,862 (48.3)	3,855
1979	238 (5.7)	885 (21.3)	202 (4.9)	1.494 (36.0)	58 (1.4)	353 (8.5)	1 (0)	918 (22.1)	4,149
1980	2,272 (51.9)	665 (15.2)	--- (0)	853 (19.5)	209 (4.8)	162 (3.7)	88 (2.0)	126 (2.9)	4,375
1981	2,954 (80.7)	126 (3.4)	59 (1.6)	50 (1.4)	184 (5.0)	--- ---	--- ---	287 (7.8)	3,660
1982	2,742 (71.9)	94 (2.5)	14 (0.4)	258 (6.8)	101 (2.7)	--- ---	90 (2.4)	512 (13.4)	3,811
1983	4,981 (49.0)	2,946 (29.0)	53 (0.5)	--- (0)	71 (0.7)	193 (1.9)	1,012 (10.0)	909 (8.9)	10,165
1984	2,853 (39.2)	1 (0)	202 (2.8)	200 (2.8)	158 (2.2)	342 (4.7)	1,200 (16.5)	2,313 (31.8)	7,269
1985	4,613 (48.0)	877 (9.1)	102 (1.1)	847 (8.8)	89 (0.9)	662 (6.9)	548 (5.7)	1,866 (19.4)	9,604

1) U.S. Fiscal years = October - September; Argentina = December - November.
2) Bread Wheat only.
3) Including "N/A".

SOURCES: Argentina:
1975/76 - 1978/79: JNG Anuerio 1981.
1979-1985: Bolsa de Cereales de Buenos Aires.

Policies and economic forces responsible for the contrasting patterns relative to the United States are beyond the scope of this report. The importance of the observed differences among countries lies in the influence which the differing strategies have on incentives, and the quality in the final product delivered into the domestic and export markets. A description and comparison of the major technologies, market channels, pricing strategies and grading practices in each country will provide the background for a comparison and analysis of the quality delivered into the domestic and export markets of each country.

ARGENTINE GRAIN INDUSTRY

Overview

The primary corn and soybean production area of Argentina is flat to gently rolling, converted from natural pampas with little clearing required. Drainage problems exist in some areas, but the soils in general are black and fertile. Argentina relies heavily on beef production for domestic and export meat supplies. This beef is grown primarily on range land and finished on high quality pastures. This provides an opportunity if not a necessity of long-term rotations using legumes. Soil tilth and fertility are therefore maintained more through rotations and nitrogen fixing legumes than through chemical fertilizers. The corn belt is also an area of wheat and soybean production and the southern part of the belt has been increasing the use of double cropping of soybeans following wheat.

Production and Marketing Technology

The technology of production including herbicides, fertilizers, equipment and cultural practices are modern and equal to those of U.S. farmers. Large tractors and combines are in common use. Casual observation suggests that tractor sizes may be somewhat smaller than for comparable acreages in the U.S., but climatic conditions in Argentina generally permit a longer harvesting and planting season, thereby lessening the need for large equipment to complete cultural practices within a few days. Corn, soybeans and wheat were harvested with large combines, and delivered primarily by commercial trucks or farm wagons to country elevators or local processors. Little storage, drying or handling equipment was found on farms. However, there is evidence of an increasing number of farmers on larger farms who have installed drying and storage equipment.

In the marketing channel, processors and first handlers were highly mechanized with modern handling equipment including dryers, belts, dump pits and hoists. A number of elevators and trucks did not have hoists and hand unloading was observed at several locations. Scales, equipment and storage bins were similar to those of the States. Transfer of technology by U.S. and international firms was clearly evident in all aspects of production and marketing.

Corn harvest in the Argentine cornbelt starts at 20-25 percent moisture. As in the United States, some farmers push these typical values to higher levels. In most regions winter storms do not present a threat to later harvest, but lodging and potential field losses encourage early harvest. Consequently nearly all corn must be dried at the country elevator. Most dryers are high temperature, cross-flow, oil fired equipment. There is some movement toward multi-stage drying using natural air to remove the last few points of moisture in the storage bin. Concrete silos and metal bins predominate at the country elevator. Platform scales, truck hoists, dump pits, belt and chain conveyors, and vertical legs are common, with designs similar to U.S. equipment. Multi-sieve cleaners are used for corn before the dryer and during load out. Outbound grain is cleaned as required to meet the Number 1 grade in response to the JNG mandated premium. Wheat and soybeans are cleaned less frequently since broken kernels are seldom a problem in these grains.

Export equipment and handling technology include belt and chain conveyors, vertical bucket elevator legs, and concrete silos for inbound grain. Cleaners were available in some export houses for use with the infrequent FM problems. Outbound equipment was primarily high speed belt conveyors and telescoping spouts for loading vessels. Trucks could be loaded directly to the vessel with flight type portable elevators when in-house capacity limitations required. These loading conditions were observed at the JNG in Buenos Aires and were probably available at other installations. The draft limitations at Buenos Aires requires top-off operations for larger vessels loaded at the major ports on the Parana River.

Load out capacity at JNG Buenos Aires was 1,200 tons per hour using four belts. They can spot 3 vessels in the loading berth. Total storage capacity is 75,000 tons.

The JNG elevator in Necochea (Port of Quequen) had 6 belts with a combined load out capacity of 3,000 tons per hour. Their total storage capacity was 90,000 tons and annual volume had averaged 2 mmt until the opening of the new cooperative facility serving both the ACA and the FACA regional cooperatives. Storage capacity at this new coop facility was 58,000 tons, with load out capacity of 1,200 tons per hour using two outbound belts. Maximum draft was 30 feet with a 4 foot tide.

Transportation from farm to first handler is provided primarily by commercial truckers. A few elevators owned trucks and provided trucking services to their farmer customers. A few large farmers also owned trucks, but the majority of the grain was moved through commercial for-hire truckers. The soybeans were moved by truck and by rail from the local elevator to the processing plant or to ports. Unofficial estimates place rail movements at 30 percent of total transportation from the country elevators. Rail is generally considered to be a cheaper form of transportation, but availability and inefficiency discourages the use of rail cars. There are at least three different gauges of railroad tracks in Argentina (some people have reported four) creating significant inefficiencies in transporting by rail between regions. In addition, nearly all railroads have been oriented towards Buenos Aires. Consequently, transport to other locations almost necessitates the use of trucks. Primary and secondary roads were in good condition and grain trucks were in evidence on the four-lane motorways.

Port facilities were also found to be modern although many of those operated by the Junta were of a much earlier vintage and often lacking in modern renovation. Several new port elevators have been built since the Argentine Government opened the export market to private firms and cooperatives. Further encouragement of private industry has resulted in expansion of existing port facilities and the development of new ones.

In late 1987 it was reported that the government had instructed the Junta Nacional de Granos to study the privatisation of its silos and handling facilities at major ports.

The Marketing Channel and Practices

Corn, soybeans, and wheat move first to the country elevator or local processor or miller. From the country elevator the grain is shipped to export or processing plants or stored for later delivery.

About one-third of Argentina's soybeans move into the export market on a fairly regular basis. The processing capacity and the quantity of soybeans crushed has grown rapidly, responding to increased production. The quantity exported appears to be a residual over domestic requirements but has almost always been a significant part of the industry. Almost all soybeans are moved from producers to country elevators although some larger farmers have begun to by-pass the country elevator delivering directly to port or processors. Many country elevators also arrange for the farmers or the commercial truckers to deliver the farmer's soybeans directly to the plant or the port in the name of the country elevator. Exports of soybean meal have been increasing rapidly in Argentina having tripled in the last six years. Domestic use of meal for feed has been quite low with no discernable trend. Since livestock feeding is primarily cattle on forages, the need for soybean meal has been small and limited primarily to a growing poultry industry and a newly developing swine industry.

Many corn processors buy directly from farmers offering the same services as a country elevator. After harvest is completed the processors rely on country elevators for supplies delivered out of storage. The market channel is organized around the large flows to ports to accommodate the 4 to 9 mmt annual exports.

Wheat follows the same market channel. Limited supplies of Durum wheat require preservation of identity in the market channel. Domestic millers using bread wheat are provided assured supplies through a government allocation program that includes purchase at harvest, storage at public and private warehouses, and export and milling quotas. Minimum price guarantees and generous storage fees assure orderly movements during the season.

Organization of the Industry

Cooperatives are an important part of the market channel in Argentina providing not only receiving and handling facilities but processing as well. It was estimated that 40-50% of grain receipts move through 1,200 country elevators owned by cooperatives. Thirty to forty percent of export volume originates with cooperatives; 15 - 30% of actual exports.

JNG owns a number (fewer than the 64 reported in 1981) of country elevators and export facilities distributed among the major port areas. Cooperatives are assuming a more prominent position in the export markets with several direct and indirect forms of encouragement from government. Two modern export houses at the port of Quequen were built by two cooperative Federations -- ACA and FACA -- and they share a high speed loading facility and berth for ocean vessels. These facilities opened in 1986 and effectively doubled the capacity of the port, cutting into the volume of the old (1946 vintage) export house operated by JNG.

The Argentine soybean crushing industry has expanded rapidly over the last few years as soybean production and exports of soybean meal increased. These firms crush other oilseeds besides soybeans. The importance of soybeans in the crush of individual firms varies from 5 percent to 100 percent. Unpublished data show 25 processors in four provinces, varying in size from 150 mt per day to over 3800 mt per day. Three of the 25 firms reported capacity above 2000 mt per day; eight reported capacity between 1000 and 2000 mt per day. Total soybean crush in Argentina was estimated at 2.4 mmt tons in 1983, increasing steadily to 5.6 in 1987 and estimated at 6.2 mmt for 1988.

Marketing Practices and Pricing Strategies of Producers

Farmer's marketing strategies in Argentina are dictated primarily by the need for cash flow, repayment of loans and high interest charges. Country elevators and processors generally provide farmers with the option of a delayed price in which a prepayment is made at the time the farmer delivers his grain with the balance to be paid at the time the farmer sets the price. They also use forward price contracts as well as spot price at delivery. Prices are established on the basis of daily quotes from the Bolsa de Cereals at each of the major port areas.

The daily cash prices at each Bolsa become a base from which the country elevators and processors price to the farmer. Prices are established prior to the opening of the market each day based on telephone calls made to the major buyers in the cash market the previous day. The average price of grain at the previous day's close then becomes the base for the next twenty four hours. In addition, individual elevators may call processors or individual port elevators and ask for specific bids for quantities and qualities which they have available. All costs including transportation to the port are subtracted from these base prices. The actual quote to the producer is generally the price given by the Bolsa, but all of the costs including the commission charged by the handling firm are then subtracted to arrive at the farmer's net receipts. Even more so than in Brazil, the elevators and handlers consider themselves as brokers even when they are taking title to the grain. They use back-to-back sales and commission on direct sales to avoid risk of price changes on inventory held in the elevator's name. Only a few of the private elevators stated that they were operating as merchandisers taking title to the grain and generating income through price changes. Most private firms and all cooperatives identified their sources of income as commission charge, and charges for services.

Although the Chicago Board of Trade and the Buenos Aires Bolsa are familiar to nearly every grain handler, country elevators make almost no use of the futures markets in Argentina as a risk shifting mechanism. Little hedging takes place on the part of the country elevator and international firms are more likely to be using the Chicago Board of Trade through their offices in other countries than to be covering any large volume on the Argentina futures markets.

Government Policies

The Government establishes minimum price supports as protection for the producers and quotes these in the local currency, Astrals. These prices are adjusted for inflation and are announced prior to planting as a guide to producers. In addition, the government establishes minimum prices at which export sales may be made. This price is quoted in U. S. dollars per ton and is intended to keep control over export volume and prevent currency drain from the country. The minimum price is generally adjusted on a daily basis to keep it in line with actual market conditions. The minimum price approximates actual market price but prevents exporters from making sales below the minimum and making up the difference in other types of currencies.

All exports of grain must be registered twenty-four hours prior to the sale. Any deviation from this registration in terms of quantity, quality, or time of shipment will result in a 15 percent penalty to the exporter. If the exporter specifies quantity and destination, he may renegotiate the registration at a later date. If the registration specifies only quantity, destination unknown, they are not allowed to deliver any above that contract and must deliver within 10 percent of the original volume recorded or pay their 15 percent penalty on the entire contract.

The marketing, milling and exporting of wheat differs from that of corn and soybeans. The Junta establishes milling requirements for domestic supplies, subtracts these from estimated production and issues export quotas for the residual. The Junta purchases one-half of the domestic volume of wheat and pays the millers to receive it and store it. The other one-half of the domestic supply is purchased on the free market. Millers accept wheat in any of the four numerical grades but must buy on official discounts. The milling industry is responsible for maintaining the quality of wheat stored for the government but the Junta inspects that wheat which they have purchased.

The Junta Nacional de Granos (The National Grain Marketing Board) has full responsibility for establishing grading standards, conducting educational programs, licensing inspectors and grading all export grain. They have the authority to enforce regulations and levy penalities for violations. These controls in conjunction with the Board's responsibility for export registration, pricing policies, support prices and credit programs provide considerable government influence on Argentine production and marketing practices. Combined with the power in the Office of the Secretary of Agriculture to control seed varieties, the government has the ability to control quality and value of Argentine corn, soybeans, and wheat from development of new varieties to final exports.

The role of the government in influencing quality generally does not extend beyond the port. Although the Argentine government enters into bilateral agreements with foreign countries, they have little additional involvement in guaranteeing quantity or quality at destination. They do not operate trade offices in importing countries, send inspection teams to supervise destination quality nor research the needs and preferences of buyers. The Junta has no organized program of interviewing foreign buyers to identify quality concerns nor do they document complaints or establish procedures for responding to complaints about quality.

There are many indirect influence of government on marketing and quality. The Argentina government has long followed the policy of taxing agriculture to provide public revenue. Those taxes have taken two forms: (1) taxes on imports such as fertilizer and pesticide and (2) taxes on exports. Prior to 1976 export taxes on wheat, corn and sorghum were as high as 50 percent. These have been gradually reduced and in late summer of 1987 all export taxes were reportedly removed to encourage exports. The effect of these taxes has been to increase the cost of production in Argentina and discourage the use of pesticides. Despite these obstacles, Argentina has increased production. Reduction or removal of the taxes will only encourage expansion of production. In late 1987 the export taxes on wheat (5 per cent of export value), maize (15 per cent), and sorghum (15 percent) were eliminated completely. Taxes on soybeans for export were reduced from 15% to 11%. Additional details on agricultural policy is given in Appendix B.

QUALITY CONTROL IN ARGENTINA

Grain grading and inspection in Argentina is under the direct control of the inspection department of the Junta Nacional de Granos. Grades are established and administered through JNG Laboratory. Test equipment is approved, tested, checked and calibrated by JNG. All inspections and analyses are required to be done by inspectors licensed and trained by JNG. This provides uniformity in application of grades and inspection procedures all the way from farmer deliveries to first handlers through analysis of samples taken during loading of export vessels. Quality control is also tied in with other departments of JNG, such as the fiscal department and the commercial department and their purchases of wheat for milling and export.

Grades for Corn, Soybeans and Wheat

Corn. Grades for Argentine maize contain only three factors: broken kernels, foreign material and damaged kernels. (Table 19). Moisture is fixed at a maximum of 14.5 percent for all grades. Broken kernels are defined as material that passes through a 4.76 mm (12/64 in.) round hole sieve. Foreign material is all material other than corn that passes through the sieve or remains on top of the sieve. Damaged kernels are handpicked from a 50 gram portion and include whole kernels and pieces of kernels that show evidence of damage of the same types described in the USDA standards. The definition of damage is similar to that in the United States standards but the interpretation is much more rigid. Any kernel that is not almost perfect in color and shape is considered a damaged kernel. Grades for flint type must contain no more than 3% of other types or color. (Appendix C). The regulation sample size is 50 g. However, many inspectors (including JNG) analyzed two 50 g. samples and averaged the results.

Soybeans. For soybeans there is only one grade with maximum limits specified on the following factors: Foreign material, broken kernels (splits) and damaged kernels, moisture, other colors, and heat damage as a subset of damage (Table 20). Foreign material is defined as all material except broken soybeans passing through a 4 mm (10/64-in.) round hole sieve and all material other than soybeans remaining on top of the sieve. Broken kernels regardless of size are hand picked from the 50 gram sample. Damaged kernels are also hand picked from the 50 gram sample and include whole or broken kernels that show evidence of damage (Appendix C). The definition of damage is similar to that in the United States standards but the interpretation is much more rigid. Any kernel that is not almost perfect in color and shape is considered a damaged kernel. Although official standards specify a 50 g. sample for analysis, in practice, duplicate analysis was frequently used requiring two 50 g. samples, i.e., 100 g. of soybeans were actually analyzed.

Wheat. Grading factors for wheat include test weight, foreign material, damaged kernels (total), heat damaged kernels, broken kernels, smut, yellow kernels and moisture. All factors except test weight and moisture are based on a 50 gram portion (Table 21). The definitions and number of factors are more complex for wheat than for corn and soybeans (Appendix C).

Test Weight: is based on kilograms per Hectoliter.
Broken kernels is all material except foreign material that passes through a slotted sieve with 1.6 by 9.5 millimeter holes.
Foreign Material is all material (including dockage) other than wheat that passes through the slotted sieve 1.6 mm x 9.5 mm and all material other than wheat remaining on the sieve.
Damaged Kernels and Heat Damaged Kernels include kernels and pieces of kernels that show the same types of damage described in the U. S. Standards except the interpretation is much more rigid than in the United States.

Table 19. Argentine Standards for Corn (Percent)

Grade	Damage	Foreign Material	Broken Kernels
No. 1	3.0	1.0	2.0
No. 2	5.0	1.5	3.0
No. 3	8.0	2.0	5.0

Maximum moisture for all grades is 14.5 percent.

SOURCE: "Resumenes De Los Estandares", Antonio Vicente and Nestor Mario Tuzzi, Fifth Edition, Buenos Aires, Arg., 1986: p. 21.

Table 20. Argentine Standards for Soybeans (Percent)

Grade[1]	Moisture	Broken and Splits	Damage		Foreign Material	
			Total	Heat	Total	Dirt
	13.0	30	5.0	2.5	3	0.5

[1] Argentina uses only one grade for soybeans with the base for discounts set at 1% impurities including .5% dirt. Factor limits shown in this table are maximum values permitted with discounts above the base.

SOURCE: "Resumenes De Los Estandares", Antonio Vicente and Nestor Mario Tuzzi, Fifth Edition, Buenos Aires, Arg., 1986: p.35.

Table 21. Argentine Standards for Wheat

Grade	Density[1]		Damage		Foreign Material	Brokens	Not DHV	Smut
	Hlt	lb/bu	Total	Heat				
1	78	60.6	1.0	0.5	.75	1.5	15.0	.1
2	76	59.0	2.0	1.0	1.50	3.0	25.0	.2
3	73	56.7	3.0	1.5	3.00	5.0	40.0	.3

Maximum moisture for all grades is 14.0 percent.

[1] Density is measured in hectoliters and converted to pounds per bushel. All other factors are measured in percent of sample weight.

SOURCE: "Resumenes De Los Estandares", Antonio Vicente and Nestor Mario Tuzzi, Fifth Edition, Buenos Aires, Arg., 1986: p. 38.

Smut includes any kernel containing smut.
Yellow Kernels includes kernels not considered dark, hard and vitreous.
Protein is not a grade factor but is measured by standard internationally approved methods and provided as information.

Wheat varieties were historically divided into Durum and semi-hard Spring wheats. As a result of disease problems, difficulty of segregation in the export market channel and emphasis upon yield, the production of Durum has declined dramatically. The great majority of wheat varieties produced in Argentina and most of their exports are now of a semi-hard, low protein Spring wheat. Separate grading standards exist for Spring and Durum wheats.

Sampling and Inspection Procedures

The inspection process at all marketing stages in Argentina is relatively simple with three factors of primary significance for corn and soybeans. Damaged kernels are of little importance at the first handler level since most corn and soybeans are delivered fresh from the field to the first handler. Since the grain is generally dried to safe storage levels at this point in the market channel, little spoilage takes place during storage. As the grain moves through the market channel, some heating and damage does occur and damaged kernels are analyzed by processors and port elevators as part of the grade determination.

Portion sizes for analysis are reduced from the original sample to a workable size by various methods. At the country elevator, they are often mixed by hand and hand divided. At some elevators, a riffle divider is used while others use a form of the Boerner. The central inspection laboratory for the Junta and their regional offices use a Boerner type divider and the analytical equipment in their laboratory is in general quite sophisticated with dielectric meters for moisture, calibrated against the air oven (AACC 44-15A) and the Brown Duval. Laboratory equipment for chemical analysis, dividers, sieves, scales and test weight devices are all equivalent to those of a U.S. inspection laboratory.

Grain is sampled and inspected when it comes from the farm to the receiving elevator using a compartmentalized trier. Generally, a zigzag sampling pattern consisting of 5-7 probes is used. However, there are variations. Some elevators made spot checks with 1-3 probes and used this sample to check for insect infestations and determine moisture. A more elaborate sampling method was then used as the truck was being unloaded. Various degrees of care were practiced in the sampling procedures. For example, it was not unusual to see the grain trier being dumped carelessly in such a manner as to lose a portion of the sample. Additions were made to the sampling canvas through grabbing individual handfuls from the truck or the unloading stream. Methods of cutting the sample to a work portion were also variable and not as carefully conducted as one might expect from official inspectors in the United States. Final selection of exact weights for analysis was often made by hand rather than scientifically obtaining smaller subsamples.

All grain delivered to the elevator is inspected by elevator employees. Each inbound truck or trailer is inspected for moisture, foreign material, broken kernels, damage and toxic seeds (Datura Ferox). Damage is not analyzed on every sample, particularly at the first receiver where damage is seldom seen. A composite sample from each producer is maintained by day or by crop year and sent to the Junta primarily to monitor analytical accuracy, grading procedures, and crop year quality.

Generally each outbound carrier of grain is sampled and inspected by the loading elevator. It is also sampled and inspected by the receiving elevator. A compartmentalized trier is used in trucks and trailers with a zigzag pattern of 5-7 probes. At one plant the spout line in the truck (the area of the truck directly below the loading spout when the truck was being loaded) was deliberately selected for taking the probe sample. This would be the spot oin the load where broken kernels and foreign material are the highest, thus biasing the sample upward on these factors. This is of special concern given that grain in commercial channels must meet "Condition CAMARA" (see glossary for explanation). If the shipper and receiver do not agree on the results of the analysis, the results may be negotiated. If a settlement cannot be reached by negotiations, the buyer or seller may initiate a review and appeal the process through CAMARA or the Junta.

Inbound grain to export elevators is sampled at origin and again at destination by employees or licensed inspectors. Often the first inspection at destination is a spot check to determine acceptability of moisture, condition and insect infestation to permit dumping the load. A more systematic sampling and detailed analysis is then completed at the truck dumps in order to provide a basis for payment. Rail cars received at the export elevator are also analyzed for grade factors, condition and insect infestation.

Outbound grain for export is sampled by JNG employees. Sampling is continuous on the belt or down spout using a small cup on a stick, sampling from a running stream as the grain moves to the vessel. The cup is small and therefore, it is difficult to reach the bottom of the belt. Observations of sampling methods suggested that no special effort was made to reach the bottom of the belt and no evidence of an understanding of the necessity of obtaining a true representation of the entire cross section of the belt. However, since the grain quality is relatively high and uniform, and in general, quite clean with low levels of broken kernels, the representativeness of the sample may be quite satisfactory regardless of the exact methodology. The grain is examined for odor and insects. A zero insect tolerance is established so that if a single insect is found the grain is treated with phosphene gas upon completion of loading. Samples of corn from the outbound belt were taken by the FGIS member of the OTA research team. Analysis of the sample demonstrated that breakage occurs in the market channel in Argentina as well as the United States (Appendix D.)

Separate samples are obtained on each shift of samplers (a shift is generally 6 hours). These samples are composited and reduced to a workable size and sent to the central Junta laboratory in Buenos Aires for analysis. All export grain samples are analyzed at the Buenos Aires lab regardless of the origin or location. Samples from other ports are generally delivered by air to Buenos Aires. The shipper normally has the final grade within 24 hours of completion of loading. In general, only 1 grade certificate is issued per vessel and the only information provided is the average for that vessel (Appendix E). Variability within the vessel and limits on that variability are not reported on the inspection certificate.

All vessels must be examined prior to loading. The holds must be clean, dry and free of insect infestation. If a single insect is found, the vessel is declared unfit to load grain. All export grain is inspected by Junta employees in the central laboratory in Buenos Aires. All samples are reduced to two 50 gram portions by use of a divider (similar to Boerner). Each 50 gram portion is analyzed for all factors and the two results are averaged for the final grade determination. The export certificate is then issued from the central laboratory. Since final export results are not known until up to 24 hours after completion of loading, it is important that Junta samplers be very knowledgeable concerning quality in order to determine, as the grain is being loaded, if any grain fails to meet grade.

Qualifications and Training of Inspectors

Argentine law requires that all sampling and analysis for grade must be done by licensed inspectors. The sampling at the country elevator was often done by unlicensed inspectors with the explanation that it is difficult to enforce that general rule at the local level. The license is obtained following a ten month training course conducted by the central laboratory of the Junta Nacional de Granos. These schools are conducted continuously at several locations throughout the country. A certificate is issued once the course is satisfactorily completed. On the job training is provided to licensed inspectors, in some cases by their returning to school and in other cases by supervision of the results and examination of file samples of grain maintained by the party doing the original inspection.

Grading Equipment

Official equipment for grading and analyzing quality in Argentina is specified by the JNG. The scales and equipment were checked by JNG and the process of monitoring file samples provided by the country elevators served as a check against improperly adjusted meters. Equipment was similar to that in the United States. Most elevators used dielectric meters calibrated against the official standard of the Brown Duval or the air oven AAOC method 44-15A. Grain probes were compartmentalized rather than the open throat common in Brazil. Hydraulic operated vacuum probes were also in use. One installation used a bank of 3 probes, hydraulically inserted at multiple locations. This appears to be an improvement over the single probe system of random distribution of a large number of samples. I have not seen this used in any other country although it was a French manufacturer.

Quality Control Through Genetics

The influence of variety and type on the quality of the corn, soybeans and wheat is well recognized by Argentine government and industry. The emphasis of producers in selection of seed, has been one of maximum profit which, in general, means maximum yields. As a result, the genetic selection over time has moved toward higher yielding wheat varieties despite the loss of protein content and the loss of some international markets that emphasize baking characteristics. Millers reported a need for higher protein and gluten strength but have found producers and government agencies unwilling to establish higher requirements. Argentine corn has historically been of the flint type. However, over the past decade, dent varieties have gradually been introduced in the genetic crosses to the point where there may no longer be any significant quantities of the pure flint types that were known as Plate Maize. Semi-dent and pure dent varieties were being produced in the regions we visited, they were purchased at the same prices as flint by some processing plants and were blended into a "Argentine Maize" mix at some of the export elevators.

Mandatory licensing provides the government some degree of control over the release of new varieties. Currently a committee with representatives from the processing industries, producer groups, plant breeders and government review characteristics of each variety prior to their approval for licensing and release. The extent of this committee's control differs among these three grains. Although this committee has the potential for major impacts upon quality, its emphasis has, in fact, been on resistance to disease, plant characteristics and yield.

In the case of wheat, protein levels are monitored but varieties with 10% and 11% protein are still approved for release. Baking characteristics are tested and presumably if a variety were submitted that did not meet an unspecified minimum it would be rejected. In fact, most varieties submitted meet this minimum criterion before the plant breeders subject it to full scale testing. In the case of corn, flintiness is evaluated and preferred but visual appearance is the only requirement with respect to hardness and flint characteristics. Protein content, carotene content and resistance to breakage have all been important characteristics in generating premiums for Argentine maize in previous years; in fact for many decades. None of these characteristics are essential for approval under the criteria implemented by the present committees. The testing procedures are focused primarily on yield and disease resistance. In the case of soybeans, maturity dates, length of growing season, disease resistance and yield are the primary criteria used by the evaluation committee. Oil and protein content are recorded but are assumed to be adequate in any variety submitted by the plant breeder. Thus, the potential exists for limiting new varieties to those that are equal to or better than, current varieties with respect to oil and protein but in practice value in processing is not a criterion in the soybean evaluation committee. The use of variety approval holds considerable potential as a method of influencing genetic-related quality characteristics. Because of its potential importance additional detail on seed selection and variety control is provided in Appendix F.

Evaluation of Quality in Argentina

The grades and standards for Argentine corn, soybeans and wheat are relatively simple when contrasted with those in the United States. There are fewer grade factors and fewer classes for each grain. This fact, combined with centralized control of standards by the Junta improves the quality of the delivered product. The Junta requirement that all grain in commercial channels must meet condition CAMARA assures the proper conditioning and cleaning of grain as close to the point of production as feasible. Condition Camara technically applies to all grain sold but is not enforced at the farm level where most farmers sell corn at moisture levels above Camara specifications. This is acceptable in that the first handler generally charges the farmer for cleaning and drying to assure Condition Camara, and the farmer is paid on the basis of the clean grain. There are instances (e.g. during years of low crop quality) in which a new grade or exception to the grade has been negotiated with the Junta to permit delivery of grain outside of the existing grades but it must be emphasized that this is indeed a difficult exception to obtain.

With only three significant factors in the grade standards for corn and strict control on moisture for corn, soybeans and wheat there is greater uniformity in the grain throughout the market channel. This reduces the opportunity for blending as a source of income or upgrading low quality grain. Whether cause or effect, the industry does not in general have physical facilities which permit or encourage blending. Large flat storage facilities at the country elevators, a limited number of bins, and cleaners not connected into storage or the grain stream, provide little opportunity for re-introduction of foreign material or damaged grain once it has been removed. At the export house there is again limited opportunity for storage of different qualities in different bins. Where we were able to observe the loading process, they were more likely to be pulling fairly uniform qualities from 2 or 3 bins at one time, not blending diverse qualities from large numbers of bins. Uniform quality distributed between one or two grades on inbound grain and on grain in storage, make it a relatively simple operational procedure to load ocean vessels according to contract specifications. Although there appeared to be less concern about uniformity among sublots so long as each vessel average equaled the contract, it also appeared that it was seldom a problem because of the uniformity of grain quality in storage for use in loading the vessels.

Export Quality in Argentina. Each export vessel loaded in Argentine ports receives a grade certificate (Appendix E) specifying quality factors and grade. Records from the Junta Nacional de Granos provide a monthly summary of quality recorded on the export certificate for the years 1982 through 1985 (Table 22). The majority of corn graded No. 1, ranging from annual average of 77.4 percent in 1983 to 96.2

percent in 1982. Monthly averages ranged from only 28.5 percent in February 1984 to 100 percent in at least one month each year. The percent of No. 1 was usually highest following harvest and lowest at the end of the crop year. Broken kernels and impurities seldom exceeded the No. 1 maximum (in the monthly averages) indicating that lower grades were determined primarily on damage. Monthly average factor values considerably below the allowed maximum for No. 1 demonstrates that the export elevators are not blending to the maximum limits. On the other hand broken corn and impurities frequently show average values above zero indicating that exporters do not clean to deliver better than contract grade quality. For example, the percent of broken kernels averaged 20.4 percent in November 1985. Several vessels were evidently loaded with broken kernels above this average. It is obvious that the corn could have been screened to lower levels of broken kernels, if the exporter had the objective of delivering better-than-contract quality.

Wheat shows a similar pattern with most certificates issued for No. 1 (Table 23). Monthly average values are better than No. 1 for all factors in nearly every month. It is therefore, not possible to determine which factor was responsible for lowering the grade to No. 2, for example, in September of 1985 when 44.6 percent of the certificates were No. 2 but average values on all factors were better than No. 1. No. 3 wheat is very seldom exported.

Soybeans in Argentina have only 1 grade and all soybeans must meet this standard. Monthly average values on all grade factors were well below the grade limits (Table 24). Moisture, in general, averaged nearly 2 percentage points below the allowable 13.0 percent. Average oil content for the year was above 21 percent except in 1983. However, monthly averages varied from 18.8 (representing only 1 vessel) to 22.2 percent.

Similar data are collected by FGIS, USDA, but the published annual averages are not directly comparable with the summary data from Argentina (Table 25). Differences in analytical techniques, sampling methods and definition of the factors make the two sets of data noncomparable. The U.S. data, like their Argentine counterpart, shows average values better-than-contract quality.

These data demonstrate that a high proportion (but not all) Argentine exports grade No. 1 in the export house. The monthly variations in quality are evidence that export elevators do not consistently clean to zero nor do they consistently blend to the contract maximum. Quality variability has a seasonal pattern with breakage and damage levels generally highest at the end of each crop year. Exporters do not clean all grain to zero impurities or broken kernels, but target below the No. 1 limit. If the exporter were blending to the maximum on every load, the average values should have been higher. If the exporter desired to deliver "better than contract quality" he could certainly achieve a lower average on several factors. The Argentine grain handling system is equipped to clean to lower levels had there been sufficient economic incentives to exceed the minimum quality permitted under the grade. It appears that the export elevator in general, ships what is received.

Table 22. Quality of Corn Exported From Argentina by Month, 1982-1985

QUALITY OF CORN EXPORTED IN 1982

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		1	4	28	211	204	102	126	106	21	28	30	41	902
Thousand of Tons		1,1	18,4	227,8	1477,8	1276,5	517,4	602,6	357,3	119,2	118,9	248,1	348,4	5313,5
GRADE	1	-	53	97	100	100	100	100	99,5	99,8	94,0	57,8	78,7	96,2
(as a %	2	00	27	3	-	-	-	-	0,5	0,2	6,0	36,2	21,3	3,5
the tons.)	3	-	-	-	-	-	-	-	-	-	-	6,0	-	0,3
Moisture	(%)	12,4	12,4	12,6	13,2	13,3	13,6	13,3	13,0	12,9	12,1	12,4	11,8	13,1
Damaged Kernels	(%)	4,56	3,49	0,78	0,75	1,01	1,12	1,26	1,64	1,97	1,68	2,26	2,44	1,21
Broken Kernels	(%)	0,94	1,29	0,75	0,72	0,57	0,71	0,62	0,58	0,76	0,96	1,19	0,76	0,70
Foreign Matter	(%)	0,34	0,33	0,24	0,13	0,15	0,17	0,18	0,08	0,15	0,17	0,25	0,15	0,15
Protein Content	(%)	9,9	9,3	9,5	9,8	9,1	9,4	9,1	9,0	10,1	11,0	8,4	9,7	9,4
Oil Content	(%)	5,1	5,2	5,1	5,4	5,2	5,2	5,2	5,2	5,2	5,2	5,1	5,6	5,3
Oleic Acid	(%)	3,5	5,9	3,3	3,4	3,3	3,6	4,0	4,4	3,4	4,0	4,6	4,4	3,7

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1982.

Table 22. (continued) Quality of Corn Exported From Argentina by Month, 1982-1985

QUALITY oF CORN EXPORTED IN 1983

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.	72	19	44	109	122	179	184	421	65	51	50	50	1.366
Thousand of Tons	424,0	71,7	235,5	611,5	1102	897,6	998,3	674,9	497,9	257,7	221,5	236,1	6.228,7
GRADE 1	44,8	39,1	50,2	78,8	92,2	80,4	80,7	81,7	77,4	59,6	74,9	84	77,4
(as a % of 2	50,7	60,5	16,0	17,9	7,0	18,6	15,4	11,9	17,1	35,8	25,1	16	18,5
the tons.) 3	4,5	0,4	33,8	3,3	0,8	1,0	3,8	6,3	5,5	4,6	-	-	4,1
Moisture (%)	11,8	11,9	11,8	12,6	12,9	12,8	12,6	12,4	12,6	12,7	12,8	12,3	12,6
Damaged Kernels (%)	3,23	3,00	3,66	2,12	2,74	2,44	2,24	2,36	2,52	2,55	2,54	2,67	2,55
Broken Kernels (%)	0,69	0,81	1,02	0,80	0,71	0,81	1,16	1,38	1,22	1,41	1,14	1,23	1,0
Foreign Matter (%)	0,20	0,22	0,23	0,21	0,13	0,18	0,18	0,27	0,22	0,32	0,37	0,21	0,20
Protein Content (%)	8,8	9,1	9,4	9,2	8,3	9,4	9,7	10,1	9,5	9,6	10,2	9,8	9,3
Oil Content (%)	5,0	5,3	4,7	5,3	4,8	4,9	4,8	4,1	5,2	5,1	5,2	5,1	4,9
Oleic Acid (%)	5,0	5,0	5,8	4,0	3,4	3,5	4,0	4,0	4,0	4,0	4,3	5,4	4,0

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1983.

Table 22. (continued) Quality of Corn Exported From Argentina by Month, 1982-1985

QUALITY OF CORN EXPORTED IN 1984

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		28	16	72	144	162	166	133	96	35	33	24	6	915
Thousand of Tons		85,4	73,0	565,9	1092	1024	826,0	702,0	530,9	238,4	253,7	119,1	53,2	5563,5
GRADE	1	53,9	28,5	89,9	100	99,2	90,5	87,5	73,2	70,3	57,7	35,9	42,1	86,5
(as a % of	2	19,7	69,9	10,1	-	0,8	7,8	12,5	21,3	29,7	38,6	59,5	28,2	11,7
the tons.)	3	26,4	1,6	-	-	-	1,7	-	5,5	-	3,7	4,6	29,7	1,8
Moisture	(%)	12,1	12,2	12,5	12,8	12,9	12,9	12,7	12,9	12,7	12,9	12,7	12,2	12,8
Damaged Kernels	(%)	2,91	3,67	1,46	1,49	1,73	1,71	2,05	2,68	2,58	2,61	3,25	4,53	1,96
Broken Kernels	(%)	1,82	0,61	0,77	0,63	0,59	0,87	1,06	0,99	1,09	1,25	1,13	1,54	0,85
Foreign Matter	(%)	0,42	0,19	0,14	0,10	0,11	0,22	0,22	0,22	0,22	0,27	0,24	0,20	0,18
Protein Content	(%)	9,2	9,6	10,1	9,2	9,7	9,9	9,5	10,0	9,8	9,2	9,4	8,9	9,6
Oil Content	(%)	5,3	4,7	5,2	5,2	5,3	5,3	5,7	5,5	5,5	5,5	5,8	4,9	5,4
Oleic Acid	(%)	3,2	4,7	2,8	2,8	2,6	3,5	2,8	4,0	6,9	4,3	3,8	4,7	3,3

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1984.

Table 22. (continued) Quality of Corn Exported From Argentina by Month, 1982-1985

QUALITY OF CORN EXPORTED IN 1985

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		6		51	202	217	181	136	101	31	20	15	21	981
Thousand of Tons		52,3		616,6	1591,6	1628,1	1159,6	891,2	604,3	212,0	158,0	105,3	141,4	7160,4
GRADE	1	4,1		99,5	99,96	97,8	88,9	93,8	76,4	100	87,7	35,4	49,7	92,0
(as a % of	2	94,3		0,5	0,04	2,2	10,2	5,2	23,6	-	12,3	64,6	50,3	7,7
the tons.)	3	1,6		-	-	-	0,9	1,0	-	-	-	-	-	0,3
Moisture	(%)	12,6		12,3	12,6	12,7	12,7	13,0	12,8	12,8	12,8	12,6	12,3	12,7
Damaged Kernels	(%)	2,80		1,15	1,18	1,46	1,77	1,72	2,15	2,30	2,18	2,83	2,62	1,0
Broken Kernels	(%)	1,70		0,83	0,64	0,82	0,92	1,01	1,17	1,16	1,41	2,04	1,79	0,9
Foreign Matter	(%)	0,90		0,14	0,11	0,17	0,17	0,20	0,23	0,24	0,27	0,40	0,37	0,1
Protein Content	(%)	10,0		9,1	10,8	9,5	8,9	9,3	8,7	9,3	9,3	9,5	8,8	9,5
Oil Content	(%)	5,8		5,1	5,7	5,1	4,9	5,2	4,8	5,0	5,0	5,1	4,9	5,2
Oleic Acid	(%)	4,6		2,6	2,4	3,1	3,3	3,0	3,9	5,6	5,6	4,9	5,0	3,2

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1985.

Table 23. Quality of Wheat Exported From Argentina by Month, 1982-1985

QUALITY OF WHEAT EXPORTED IN 1982

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		139	208	173	48	24	22	13	19	6	6	12	7	677
Thousand of Tons		929,0	1400,0	878,6	201,1	53,6	19,0	4,8	13,4	2,2	1,8	6,6	106,9	3617
GRADE	1	90	71	79	57	62	87	100	66	40,9	83	42,4	98,9	77,8
(as a % of	2	10	29	21	43	38	13	-	34	59,1	17	57,6	1,1	22,2
the tons)	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Moisture	(%)	12,2	12,6	12,8	12,6	12,9	13,2	13,0	12,9	13,1	12,8	12,7	12,2	12,5
Hectolitric Weight (kg/hl)		82,40	82,05	82,35	82,85	82,80	82,65	81,70	82,85	82,30	82,65	80,30	81,60	82,25
Damaged Kernels	(%)	0,52	0,36	0,39	0,41	0,47	0,54	0,52	0,44	0,55	0,52	0,68	0,48	0,42
White Kernels	(%)	3,26	2,86	2,42	2,71	2,82	4,87	4,3	2,94	2,77	3,73	2,65	6,24	2,96
Foreign Material	(%)	0,47	0,53	0,55	0,55	0,44	0,46	0,56	0,72	0,52	0,54	0,50	0,40	0,52
Broken Kernels	(%)	0,94	1,21	1,34	1,35	1,14	0,98	0,98	0,85	1,44	0,87	1,02	0,98	1,17
Protein Content	(%)	12,9	13,0	13,1	13,2	12,6	12,6	12,2	12,5	12,2	13,1	13,3	12,2	12,9

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1982.

Table 23. (continued) Quality of Wheat Exported From Argentina by Month, 1982-1985

QUALITY OF WHEAT EXPORTED IN 1983

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.	150	206	190	104	76	87	91	66	57	62	34	44	1.167
Thousand of Tons	1.628,5	1.922,1	1.570,7	722,2	514,5	628,4	710,7	378,96	438,1	496,5	377,6	708,7	10.097,
GRADE 1	86,4	90,5	93,2	97,5	80,5	68,0	74,6	64,2	56,2	36,4	50,4	74	80,
(as a % of 2	13,6	9,5	6,5	2,5	19,5	32,0	25,4	35,8	43,8	60,5	45,1	26	19,
the tons) 3	-	-	0,3	-	-	-	-	-	-	3,1	4,5	-	0,
Moisture (%)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hectolitric Weight (kg/hl)	12,5	12,3	12,8	12,7	13,1	12,8	12,4	12,3	12,3	13,2	12,2	12,1	12,
Damaged Kernels (%)	81,60	81,75	82,10	82,35	81,85	81,55	82,20	82,15	82,10	81,10	81,75	81,87	81,
White Kernels (%)	0,32	0,39	0,20	0,46	0,48	0,40	0,45	0,45	0,40	0,42	0,38	0,39	0,
Foreign Material (%)	7,54	8,44	8,50	9,56	8,04	6,82	7,48	6,72	8,10	6,63	7,00	4,33	7,
Broken Kernels (%)	0,35	0,36	0,39	0,48	0,39	0,52	0,50	0,64	0,57	0,64	0,73	0,52	0,
	1,08	1,16	1,15	1,26	1,18	1,47	1,31	1.32	1,65	1.72	1,61	1.25	1,
Protein Content (%)	— 11,3	10,6	9,9	10,8	10,6	10,9	10,9	11,1	10,8	11,1	11,0	11,3	10,

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1983.

Table 23. (continued) Quality of Wheat Exported From Argentina by Month, 1982-1985

QUALITY OF WHEAT EXPORTED IN 1984

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		156	169	144	96	71	57	48	38	22	19	13	13	846
Thousand of Tons		1801	1843	1522	763	410	256	166	96	152	78	21	233	7341
GRADE	1	48,9	55,8	38,1	23,0	13,1	13,1	13,8	9,1	20,1	18,7	11,3	38,9	39,8
(as a % of	2	51,1	44,2	61,9	77,0	83,0	86,9	86,2	79,6	61,7	81,3	88,7	61,1	59,5
the tons)	3	-	-	-	-	3,9	-	-	11,3	18,2	-	-	-	0,7
Moisture	(%)	-	-	-	-	-	-	-	-	-	-	-	-	-
Hectolitric Weight (kg/hl)		12,3	12,6	12,5	12,5	12,7	12,6	12,4	12,4	12,6	12,7	13,0	12,3	12,5
Damaged Kernels	(%)	81,53	81,63	81,28	81,30	81,18	81,05	81,06	81,40	80,85	81,10	80,90	81,59	81,41
		0,47	0,54	0,44	0,38	0,38	0,42	0,41	0,45	0,48	0,41	0,60	0,39	0,46
White Kernels	(%)	6,81	6,79	6,80	6,54	5,17	5,10	5,98	5,79	7,16	5,54	5,18	5,49	6,54
Foreign Material	(%)	0,50	0,48	0,52	0,61	0,72	0,73	0,74	0,83	0,77	0,56	0,36	0,40	0,54
Broken Kernels	(%)	1,49	1.34	1.60	1.88	1.94	2.00	2.25	1.84	2.14	1,92	1.87	1,79	1,61
Protein Content	(%)	13,5	13,3	13,2	13,0	12,9	12,9	12,6	12,5	12,3	12,6	12,7	13,1	13,2

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1984.

Table 23. (continued) Quality of Wheat Exported From Argentina by Month, 1982-1985

QUALITY OF WHEAT EXPORTED IN 1985

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		143	209	193	130	81	30	30	21	18	52	52	48	1007
Thousand of Tons		1463,6	1938,7	1480,1	1091,8	692,5	407,6	445,3	284,0	266,9	399,8	543,1	560,7	9574,1
GRADE	1	85,0	99,8	96,6	90,1	91,6	86,5	80,5	70,5	55,4	80,5	86,4	55,0	87,6
(as a % of	2	15,0	0,2	3,4	9,9	8,4	13,5	19,5	29,5	44,6	19,5	13,6	45,0	12,4
the tons)	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Moisture	(%)	12,7	12,7	12,8	12,8	12,8	12,7	12,7	12,6	12,5	12,8	12,7	12,5	12,7
Hectolitric Weight	(kg/hl)	2,39	82,18	82,40	82,36	82,49	82,40	82,37	82,48	82,20	82,17	82,29	81,10	82,26
Damaged Kernels	(%)	0,45	0,44	0,47	0,44	0,38	0,31	0,37	0,37	0,51	0,40	0,48	0,79	0,45
White Kernels	(%)	4,24	4,41	5,16	6,47	7,67	8,59	7,89	8,43	9,48	7,06	7,21	4,13	5,82
Foreign Material	(%)	0,39	0,41	0,40	0,46	0,51	0,54	0,57	0,65	0,72	0,55	0,55	0,43	0,46
Broken Kernels	(%)	1,14	0,98	0,93	0,99	1,10	1,10	1,16	1,29	1,26	1,23	1,19	1,35	1,08
Protein Content	(%)	12,9	13,2	13,0	12,9	12,5	12,2	12,1	11,9	12,3	12,4	12,7	13,8	12,8

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1985.

Table 24. Quality of Soybeans Exported From Argentina by Month, 1982-1985

QUALITY OF SOYBEANS EXPORTED IN 1982

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		-	-	-	-	23	85	99	50	14	3	4	9	287
Thousand of Tons						218,4	573,8	617,7	280,8	48,6	11,4	63,1	109,6	1923,4
Moisture	(%)					11,4	11,7	12,0	11,7	11,6	11,1	11,2	10,1	11,6
Damaged Kernels	(%)					0,40	0,43	0,59	0,66	0,74	0,78	0,91	0,71	0,55
Broken Kernels	(%)					11,70	13,50	17,80	16,74	16,42	15,27	17,04	19,36	15,68
Foreign Material	(%)					0,50	0,60	0,62	0,66	0,66	0,68	0,74	0,82	0,62
Protein Content	(%)					40,6	40,9	41,3	42,4	41,4	41,5	40,8	41,0	41,2
Oil Content	(%)					21,5	21,2	21,9	20,2	21,5	21,2	22,0	21,3	21,4
Oleic Acid	(%)					0,7	0,9	0,8	0,5	0,9	1,0	0,5	0,9	0,8

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1982.

Table 24. (continued) Quality of Soybeans Exported From Argentina by Month, 1982-1985

QUALITY OF SOYBEANS EXPORTED IN 1983

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		8	-	-	-	2	12	57	45	34	12	7	3	180
Thousand of Tons		95,1				19,3	154,6	426,9	348,1	220,5	88,4	44,6	23	1420
Moisture	(%)	11,1				11,6	11,7	11,4	11,5	11,3	11,3	11,1	11,1	11,4
Damaged Kernels	(%)	1,03				0,32	0,20	0,38	0,40	0,56	1,30	0,56	0,50	0,50
Broken Kernels	(%)	11,38				6,44	9,58	12,02	13,38	13,80	15,29	14,00	14,70	12,5
Foreign Material	(%)	0,60				0,27	0,50	0,44	0,63	0,58	0,62	0,64	0,7	0,5
Protein Content	(%)	43,6				41,4	40,3	41,8	40,0	42,5	41,6	42,3	42,2	41,4
Oil Content	(%)	21,1				21,2	19,8	20,4	20,4	21,4	20,8	21,6	20,2	20,6
Oleic Acid	(%)	1,0				0,9	0,7	0,7	0,7	0,7	0,8	1,2	0,8	0,7

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1983.

Table 24. (continued) Quality of Soybeans Exported From Argentina by Month, 1982-1985

QUALITY OF SOYBEANS EXPORTED IN 1984

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.	--	1	1		2	41	91	96	76	34	17	20	9	388
Thousand of Tons		2,98	8,0		1,4	319,9	635,5	885,5	651,1	199,3	128,0	166,7	49,6	3066,0
Moisture	(%)	12,0	11,5		11,8	12,0	11,8	11,5	11,9	11,7	11,4	11,8	11,0	11,7
Damaged Kernels	(%)	7,5			0,2	0,7	0,6	0,6	0,5	0,7	0,6	0,4	0,7	0,6
Broken Kernels	(%)	18,9	16,5		6,0	9,6	12,0	12,8	11,6	14,6	12,4	12,2	12,1	12,1
Foreign Material	(%)	0,7	0,6		0,2	0,3	0,4	0,5	0,5	0,6	0,5	0,6	0,6	0,5
Protein Content	(%)	41,2	11,5		s/d.	40,9	41,8	41,4	42,0	41,3	42,9	42,2	42,5	41,7
Oil Content	(%)	22,2	20,3		21,7	20,8	21,4	21,5	20,5	21,0	22,2	21,1	21,8	21,2
Oleic Acid	(%)	2,5	1,2		0,6	0,6	0,7	0,7	0,9	0,8	0,8	0,8	0,8	0,7

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1984.

Table 24. (continued) Quality of Soybeans Exported From Argentina by Month, 1982-1985

QUALITY OF SOYBEANS EXPORTED IN 1985

		January	February	March	April	May	June	July	August	September	October	November	December	Total
Number of C.A.C.		1		1		27	82	91	60		3		1	266
Thousand of Tons		2,2		5,5		371,1	963,8	835,8	583,9		5,7		0,4	2768,4
Moisture	(%)	11,5		11,4		11,5	11,8	11,7	11,8		11,0		11,3	11,7
Damaged Kernels	(%)	1,0		1,5		0,3	0,4	0,3	0,3		0,1		0,3	0,3
Broken Kernels	(%)	13,7		11,5		7,0	8,7	9,8	10,0		8,4		5,7	9,1
Foreign Material	(%)	-		0,6		0,3	0,4	0,4	0,4		0,2		0,8	0,4
Protein Content	(%)	42,0		41,8		39,4	40,3	38,7	42,4		42,3		s/d.	40,1
Oil Content	(%)	18,8		20,5		20,8	21,1	21,7	21,7		19,5		s/d.	21,4
Oleic Acid	(%)	1,3		0,8		0,7	0,7	0,7	0,7		0,7		s/d.	0,7

SOURCE: National Grain Board, "Calidad de los Granos Exportados" Gerencia Tecnica, Argentina 1985.

Table 25. Quality of Grain Exported from Argentina, 1982-1985

Year	Moisture		Damage		Foreign Material		Broken Kernels		% of Tonnage in Grade		
	Ave.	Max[1]	Ave.	Max[1]	Ave.	Max[1]	Ave.	Max[1]	#1	#2	#3
(Spring Wheat), (Percent)											
1982	12.5	13.2	0.42	0.55	0.52	0.72	1.17	1.44	77.8	22.2	0
1983	12.6	13.2	0.37	0.48	0.46	0.73	1.26	1.72	80.0	19.7	0.3
1984	12.5	13.0	0.46	0.60	0.54	0.83	1.61	2.25	39.8	59.5	0.7
1985	12.7	12.8	0.45	0.79	0.46	0.72	1.08	1.35	87.6	12.4	0
(Corn) (Percent)											
1982	13.1	13.6	1.21	4.56	0.15	0.34	0.70	1.29	96.2	3.5	0.3
1983	12.6	12.9	2.55	3.66	0.20	0.37	1.00	1.41	77.4	18.5	4.1
1984	12.8	12.9	1.96	4.53	0.18	0.42	0.85	1.82	86.5	11.7	1.8
1985	12.7	13.0	1.60	2.83	0.18	0.90	0.92	2.04	92.0	7.7	0.3
(Soybeans) (Percent)											
1982	11.6	11.7	0.55	0.91	0.62	0.82	15.68	19.36	100[2]	---	---
1983	11.4	11.7	0.50	1.30	0.50	0.70	12.50	15.29	100	---	---
1984	11.7	12.0	0.60	7.5	0.5	0.7	12.10	18.90	100	---	---
1985	11.7	11.8	0.30	1.5	0.4	0.6	9.10	13.70	100	---	---

[1] Maximum values are monthly averages indicating seasonal variability.
[2] Argentine standards use only one grade for soybeans.

A second piece of evidence that Argentine exporters are guided by grades rather than idealism is found in the quality of individual vessels loaded at Necochea. The quality certificates on the last three vessels of wheat loaded prior to our interview at the export elevator showed foreign material of 0.58, 0.70 and 0.60 percent respectively. Percent of broken grains on these same certificates was 0.60, 0.88, and 0.84 percent respectively. No. 1 wheat allows 0.75 percent foreign material and 1.00 percent broken grain. These vessels were consistently loaded below the No. 1 limits but only by a small margin. The presence of cleaners in this elevator and a practice of cleaning excessively dirty loads suggest that management did not follow a strategy of delivering better-than-grade quality when it represented a cost or loss of value. They could have cleaned these shipments to levels below .5 percent brokens and .5 percent impurities had they wished to do so.

Incentives for Quality in the Argentine System. The Junta Nacional de Granos establishes the discounts and premiums associated with grades of corn other than No. 2. A premium of 1% is automatic for No. 1 corn. A discount of 1 1/2% is automatic for corn grading No. 3. The base price is established in the BOLSA and discounts calculated from that base. Grain delivered below No. 3 is discounted by individual factors. These discounts again are established by JNG. This provides an incentive throughout the market system for striving to deliver No. 1 corn. Since only three factors control numerical grade (brokens, impurities and damage), it is relatively simple and inexpensive for farmers to deliver No. 1 or to pay the elevator to clean and dry their grain to No. 1. The country elevators in turn have an incentive for maintaining quality in storage and for removing broken kernels before shipping into the market channel. The maximum allowances for damage, brokens and foreign material are greater than zero even for No. 1 grain and there is evidence that many grain handlers recognize the opportunity for blending on the grade factors to achieve those maximums allowable for No. 1 corn. These maximums were low enough however, that the blending opportunities are fairly limited and provided little incentive for the complex system required for the sophisticated blending found in the United States grain marketing channel.

U.S. corn standards include a larger number of grades, prices are based on No. 2 and premiums for No. 1 are infrequent and at the option of the buyer. Export contracts generally specify one grade lower than the domestic trade (e.g., No. 3 corn, No. 2 soybeans). Consequently, there is an incentive to deliver the maximum allowed on each factor. The more factors that determine grade and the greater the range between farmer delivered quality and export contract, the more incentives there are for blending. Since domestic sales need not conform to any of the numerical grades, there is is a much greater range of qualities in the U.S. market channel than in the Argentine market channel.

Discounts based on numerical grade give the same price allowances whether the lower grade is determined by one factor or three. Discounts differ widely among elevators in the United States but in general the sum of discounts on individual factors for Grade 3 below Grade 2 would be greater in the United States than the 1½ percent discount for the same grade difference in Argentina. A discount of 1½ percent for No. 3 corn is equivalent to less than 3 cents per bushel at U.S. corn prices of $1.80. Many U.S. elevators have higher discounts. The data available do not suggest that Argentina discounts offer greater incentives for quality improvement than U.S. discounts.

Protein in wheat receives no consistent premium and the lack of interest in improving protein is evident in plant breeding strategies, farmers choice of variety, and lack of interest in protein on the part of most merchandisers. Millers would like a higher protein, exporters occasionally find a premium market for a small volume supply, but the system is not organized to convey this economic information from millers and foreign buyers back to those who control genetic levels of protein. Many U.S. wheat growers receive price differentials based on protein content.

Breakage and breakage susceptibility in corn and soybeans are of increasing concern to elevator managers, exporters and processors. High speed, high temperature drying is generally recognized as a major cause of breakage. However, few dryer operators expend time or money to control breakage susceptibility other than to minimize losses from excess breakage within their own plant. Thus the Argentine system provides incentives for maintaining superior quality in the market system on some measures of quality but only on those incorporated in formal grading standards.

There is an additional incentive for quality. This is an intangible and nonquantifiable attitude on the part of most of the people we interviewed throughout the market channel from producer to exporter to government official. We frequently heard that Argentina is proud of its reputation of quality and is willing to take special efforts to maintain that quality and reputation. This was best reflected in a statement by a government official. "We cannot compete with the United States with technology, price and credit terms; we must compete by providing better quality". This was reflected throughout the market channel by those who simply assumed that grain would be dried to safe storage levels at the first opportunity in the market channel; that blending was not considered a major source of income; that customer satisfaction was important in order to maintain domestic and international markets; and that the best grain should be exported and problem grain used domestically.

We cannot prove whether the lack of incentives resulted in construction of facilities unsuited to blending or whether the construction of facilities limit blending regardless of incentive. However, it is a fact that incentives exist, but the industry in general has not designed, built or organized facilities and handling equipment to facilitate blending diverse qualities for profit. In the case of moisture, the government has set maximum moisture for all grades of corn at 14.5 percent; soybeans 14.0 percent; and wheat at 14 percent. This limits the opportunity for wet grain to move in the market channel. As a result, economic incentives for drying appear to be less important than they are in the United States. However, the shrink factors published by the Junta in official tables are, in fact, quite severe for moisture levels up to 16%. The design of the discount table results in a graduated shrink factor per point of excess moisture with the most severe being the first point of moisture. The shrink per point declines asymptotically to the actual water loss as the initial moisture level increases. This does not provide a deterrent to producers harvesting at 20-25% moisture. The drying charge at the country elevator plus a shrink factor which is approximately equal to actual weight loss during drying is not conducive to constructing on farm storage and drying facilities.

COMPARISON OF GRADING AND TECHNOLOGY

The preceding pages have identified many similarities in the technology of production, marketing and processing. Technical skills and engineering design move readily across cultures and economic systems. From genetics to retail packaging of products the two systems draw on the same reservoir of international "know-how." There are only a few differences, such as on-farm storage so prevalent in the United States but virtually absent in Argentina. Appendix G summarizes these similarities and differences.

Grades and grading practices have fewer elements in common. Both countries have numerical grades but the number and definition of factors differ. A government agency is responsible for grading and inspection in both countries but the government inspection agency in Argentina has broader powers than in the U.S., with control over loading of vessels. They also own and operate a portion of the assembly, distribution and export facilities. These comparisons are summarized in Appendix H.

SUBJECTIVE IMPRESSIONS OF QUALITY INFLUENCES IN ARGENTINA

Intensive interviews and observation of the marketing process for a period of two weeks in Argentina, provide some insights into the factors that influence quality. Not all of these insights can be quantified and may be subject to different interpretations by different people observing the same set of circumstances. However, we feel that these impressions should be shared; while emphasizing that they are in fact, impressions not factual data.

(1) Historical, economic and political conditions in Argentina have resulted in production and marketing systems in which almost all corn, soybeans and wheat are delivered directly from the farm at harvest to the first handler. There is very little on-farm storage and conditioning and what little is done is limited to fairly large quasi-commercial operations. Therefore, the conditioning and cleaning of grain after it leaves the farmer's combine is done almost entirely in commercial facilities with the accompanying technology and management skills in the market place.

(2) The premiums and discounts established by the JNG in Argentina provide economic incentives for producers and marketing firms to deliver high quality grain; high quality meaning No. 1 with the required cleanliness and low levels of damage.

(3) Numerical grades are few in number and simple in factor construction reducing the opportunity and the incentives for multiple blending on multiple factors and making less complex the process of meeting the No. 1 requirement. Blending diverse moistures and impurities to meet the standard was found at only a few of the firms we interviewed.

(4) Government control of the entire process of grades, grading and inspection in Argentina provides a high degree of uniformity and a fairly rigorous application of these grades at all points in the market channel. The interpretation of damage is strict and inspection agencies rigorously enforce quality standards. All grain in and out of the port moves under Condition Camara, using JNG grade specifications.

(5) The cumulative effect of items 1 through 4 is to generate a clean, storable, low moisture grain at the first point in the market channel with subsequent storage and handling made easier as a result of this level of quality and cleanliness.

Grain marketing firms recognize the economic relationships between prices, discounts, and quality. They also recognize that delivering minimum quality allowed by the grades can be a source of income. Blending and upgrading do take place when that opportunity (physical and economic) is available. However, such activities are the exception as the result of the relationships described in 1 through 4.

GLOSSARY OF TERMS

ARGENTINA

Junta Nacional de Granos

The Junta Nacional de Granos (also referred to as the Grain Board and JNG) is the government agency in Argentina regulating the grain industry. There are numerous departments within JNG with a wide range of responsibilities. Those especially relevant for this study include the Commercial Department with merchandising responsibilities, and the Inspection Department with responsibility for grades, grading, laboratory analysis, and education.

The inspection department establishes standards, trains inspection personnel at all levels of inspection private and Government, monitors grain quality, checks inspection and weighing equipment, and establishes grade/factor discounts used by industry. The Junta is the final judge, handling appeals in the event of disputes on grain quality in the domestic market. They sample and inspect the export grain for quality and certificate the grade.

Other departments set price support levels, minimum export prices, levy penalties on the grain industry not abiding by the rules of the system, administer export registrations, and allocate export quotas.

CAMARA Arbitral de la Bolsa de Cereals (Camara)

The Camara is an association of private grain firms with broad representation. It has some of the same responsibilities as the National Grain and Feed Association in the United States and the Grain and Feed Trade Association of London. They have grain inspectors trained and licensed by the JNG and provide grain inspection as requested by the buyer or seller. Most contracts at the 2nd level in the market (past the producer) are based on Camara rules. In case of disputes the Camara serves as an arbitration board. The decision by Camara may be appealed to the JNG inspection department. Not all grain samples are submitted to the Camara for inspection. Generally, only samples representing grain that does not meet Condition Camara are submitted.

Condition Camara

All contracts are made "Condition Camara" meaning that quality must fall within the official grades and the maximum limits on moisture. All grain moving in commercial channels is required to meet condition Camara. Exceptions are very rare and must be negotiated with the JNG if moving under official inspection. Farm-to-market shipments are theoretically included, however they escape enforcement on the technicality that farm deliveries are put into Condition Camara at the farmers' expense and priced on the basis of that grade.

Appeals of Argentine Grades

If buyer and seller disagree on quality they may request another evaluation. During the first marketing stage (producer to elevator), if the farmer is not satisfied with the analysis, he has two choices. He may request another inspection by the elevator or he may request the sample be sent to the Junta laboratory. All producer samples are sent to the Junta for review but analysis is not automatic. If the elevator performs the review, the same individual who performed the first analysis would perform the second one.

At the second stage of marketing (from country elevator forward), the shipper and receiver inspect the grain. If there is a dispute, the sample is sent to the Camara for analysis. If either party is still not satisfied, the sample may be sent to the Junta Central Laboratory in Buenos Aires.

At the third stage of marketing (export), if the grain does not meet export quality Grade 1 or 2 the Junta inspector stops the elevator from loading and the problem is corrected before loading continues. Junta inspectors have a considerable amount of control at the export elevator.

Only a minimum amount of grain at any stage is ever submitted for appeal or arbitration.

Impurities

Impurities in Argentina grades referred to non-grain materials. It is similar to United States term foreign material except for the effort made to separate broken grain from the category. Since sieves were still part of the determination of impurities a complete distinction between grain and non-grain is impossible.

Delayed Price

In the United States, delayed price is a marketing technique where a farmer sells and delivers title to grain but reserves the right to select a later date on which to establish price. It usually does not include partial payment at the time of delivery. Argentina uses several variations of this technique but partial payment at the time of delivery is usually a part of the contract.

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APPENDIX A

Table 1. Production and Utilization of Soybeans in Argentina, 1965-1987 (in 1,000 mt)[1]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Crush	Food	Fd/Sd	Ttl Usage	End Stx
65	16	1.063	17	0		17	0	6	0	1	7	10
66	16	1.125	18	10	0	28	0	5	0	2	7	21
67	17	1.235	21	21	0	42	0	5	0	2	7	35
68	20	1.100	22	35	0	57	0	11	0	2	13	44
69	28	1.143	32	44	0	76	0	15	0	3	18	58
70	26	1.038	27	58	0	85	0	21	0	4	25	60
71	36	1.639	59	60	0	119	0	36	0	7	43	76
72	68	1.147	78	76	0	154	0	46	0	16	62	92
73	157	1.732	272	92	0	364	0	195	0	35	230	134
74	344	1.442	496	134	0	630	0	281	0	42	323	307
75	356	1.362	485	307	0	792	0	529	0	45	574	218
76	434	1.601	695	218	0	913	111	496	0	71	678	235
77	660	2.121	1400	235	0	1635	623	589	0	136	1348	287
78	1250	2.160	2700	287	0	2987	1969	686	0	185	2840	147
79	1600	2.313	3701	147	0	3847	2776	639	0	205	3620	227
80	2030	1.773	3599	227	0	3827	2726	720	0	177	3623	204
81	1740	2.011	3499	204	0	3703	2190	1081	0	198	3469	234
82	1986	2.090	4151	234	0	4384	2151	1907	0	220	4278	106
83	2281	1.841	4199	106	0	4306	1338	2399	0	238	3975	331
84	2910	2.405	6999	331	0	7329	3132	3617	0	305	7054	275
85	3270	2.064	6749	275	0	7025	2954	3445	0	335	6734	291
86	3350	2.179	7300	291	0	7590	2600	4450	0	364	7414	176
87	3650	2.110	7702	176	0	7878	2650	4675	0	370	7695	183

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[1] Harvested acreage in 1,000 hectares: yields in mt/hectares.

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table 2. Production and Utilization of Soybean Meal in Argentina, 1965-1987 (in 1,000 mt)

Year	Crush	Extrac Rate	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
65	6	83.3%	5	0	0	5	0	0	0	5	5	0
66	5	80.0%	4	0	0	4	0	0	0	4	4	0
67	5	80.0%	4	0	0	4	0	0	0	3	3	1
68	11	72.7%	8	1	0	9	0	0	0	6	6	3
69	15	80.0%	12	3	0	15	0	0	0	15	15	0
70	21	76.2%	16	0	0	16	0	0	0	16	16	0
71	36	75.0%	27	0	0	27	0	0	0	25	25	2
72	46	76.1%	35	2	0	37	0	0	0	35	35	2
73	195	77.4%	151	2	0	153	14	0	0	137	151	2
74	281	76.2%	214	2	0	216	12	0	0	174	186	30
75	529	76.7%	406	30	0	436	158	0	0	265	423	13
76	496	77.4%	384	13	0	397	251	0	0	131	382	15
77	589	77.2%	455	15	0	469	325	0	0	141	466	3
78	686	78.1%	536	3	0	539	370	0	0	156	526	13
79	639	78.1%	499	13	0	512	260	0	0	244	504	8
80	720	77.9%	561	8	0	569	277	0	0	277	554	15
81	1081	77.5%	838	15	0	853	591	0	0	241	832	21
82	1907	78.7%	1501	21	0	1522	1209	0	0	261	1470	52
83	2399	80.2%	1924	52	0	1976	1765	0	0	116	1881	95
84	3617	80.0%	2894	95	0	2988	2663	0	0	206	2869	119
85	3445	79.5%	2739	119	0	2858	2600	0	0	224	2824	34
86	4450	79.3%	3529	34	0	3563	3150	0	0	280	3430	133
87	4675	79.6%	3721	133	0	3854	3450	0	0	250	3700	154

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table 3. Production and Utilization of Soybean Oil in Argentina, 1965-1987
(in 1,000 mt)

Year	Crush	Extrac Yield	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
65	6	16.7%	1	0	0	1	0	0	1	0	1	0
66	5	20.0%	1	0	0	1	0	0	1	0	1	0
67	5	20.0%	1	0	0	1	0	0	0	0	0	1
68	11	18.2%	2	1	0	3	0	0	3	0	3	0
69	15	20.0%	3	0	0	3	0	0	2	0	2	1
70	21	19.0%	4	1	0	5	0	0	5	0	5	0
71	36	16.7%	6	0	0	6	0	0	6	0	6	0
72	46	17.4%	8	0	0	8	0	0	7	0	7	1
73	195	14.9%	29	1	0	30	22	0	5	0	27	3
74	281	16.7%	47	3	0	50	33	0	14	0	47	3
75	529	17.4%	92	3	0	95	20	0	67	0	87	8
76	496	16.3%	81	8	0	89	67	0	18	0	85	4
77	589	16.3%	96	4	0	100	64	0	33	0	97	3
78	686	16.3%	112	3	0	115	59	0	52	0	111	4
79	639	16.6%	106	4	0	110	102	0	4	0	106	4
80	720	16.8%	121	4	0	125	88	0	25	0	113	12
81	1081	16.9%	183	12	0	194	84	3	100	0	187	7
82	1907	16.4%	313	7	0	320	220	3	79	0	302	18
83	2399	16.4%	393	18	0	412	298	1	75	0	374	38
84	3617	16.4%	593	38	0	631	504	1	77	0	582	49
85	3445	16.8%	579	49	0	628	540	1	46	0	587	41
86	4450	16.7%	743	41	0	784	620	1	94	0	715	69
87	4675	16.7%	781	69	0	849	645	1	99	0	745	104

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table 4. Supply and Demand for Wheat in Argentina, 1960-1986. (in 1,000 mt)[1]

Mktg Yr	Year	Local Crop Year	Beg Stx 1000 Mt	Area Hrv 1000 Ha	Yield Q./Ha	Prod'n 1000 Mt	Total Supply 1000 Mt	Total Imports 1000 Mt	Total Exports 1000 Mt	Dom Feed 1000 Mt	Dom Food 1000 Mt	Total Usage 1000 Mt
60	60-61	(Dec-Nov)	1192	3622	11.6	4202	5394	0	1094	135	3399	3534
61	61-62	(Dec-Nov)	764	4421	12.9	5703	6467	0	2717	134	3695	3829
62	62-63	(Dec-Nov)	243	3745	15.2	5692	5935	0	1796	138	3505	3643
63	63-64	(Dec-Nov)	504	5676	15.8	8968	9472	0	3460	143	3628	3771
64	64-65	(Dec-Nov)	2213	6136	18.4	11290	13503	0	6287	146	3700	3846
65	65-66	(Dec-Nov)	3340	4601	13.2	6073	9413	0	5586	139	3519	3658
66	66-67	(Dec-Nov)	175	5214	12.0	6257	6432	134	2233	155	3923	4078
67	67-68	(Dec-Nov)	245	5812	12.6	7323	7568	35	2199	167	4226	4393
68	68-69	(Dec-Nov)	1008	5837	9.8	5720	6728	390	2494	144	3650	3794
69	69-70	(Dec-Nov)	850	5191	13.5	7008	7858	0	2322	181	4587	4768
70	70-71	(Dec-Nov)	780	3701	13.3	4922	5702	0	969	31	4025	4056
71	71-72	(Dec-Nov)	675	4315	13.2	5696	6371	0	1629	29	4327	4356
72	72-73	(Dec-Nov)	370	4965	13.9	6901	7271	493	3193	54	4247	4301
73	73-74	(Dec-Nov)	269	3958	16.6	6570	6839	0	1582	50	4171	4221
74	74-75	(Dec-Nov)	1026	4233	14.1	5969	6995	0	1784	212	4286	4498
75	75-76	(Dec-Nov)	714	5270	16.3	8590	9304	0	3162	982	4398	5380
76	76-77	(Dec-Nov)	742	6385	17.1	10918	11660	0	5900	542	3700	4242
77	77-78	(Dec-Nov)	1600	3910	14.6	5709	7309	0	1775	200	4149	4349
78	78-79	(Jul-Jun)	1176	4685	17.3	8105	9281	0	4080	100	3993	4093
79	79-80	(Dec-Nov)	1103	4787	16.9	8090	9193	0	4755	200	3800	4000
80	80-81	(Dec-Nov)	428	5023	15.5	7786	8214	0	3845	150	3800	3950
81	81-82	(Dec-Nov)	413	5883	14.0	8236	8649	0	3638	150	4150	4300
82	82-83	(Dec-Nov)	775	7320	20.5	15006	15781	0	9870	200	4649	4849
83	83-84	(Dec-Nov)	1056	6880	18.5	12728	13784	0	7847	150	4550	4700
84	84-85	(Dec-Nov)	1259	5950	22.2	13209	14468	0	9408	75	4525	4600
85	85-86	(Dec-Nov)	451	5270	16.1	8485	8936	0	4300	75	4325	4400
86	86-87	(Dec-Nov)	251	5050	18.2	9191	9442	0	4650	100	4400	4500

[1] Harvested acreage in 1,000 ha; yields in quintals/hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn and Total Coarse Grains.

APPENDIX A

Table 5. Production and Utilization of Soybeans in the United States, 1964-1986 (in 1,000 mt)[1]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Crush	Food	Fd/Sd	Ttl Usage	End Stx
64	12462	1.531	19079	1832	0	20911	5774	13036	0	1290	20100	811
65	13941	1.651	23017	811	0	23828	6820	14628	0	1404	22852	976
66	14790	1.709	25276	976	0	26252	7119	15225	0	1442	23786	2466
67	16109	1.650	26580	2466	0	29046	7255	15687	0	1559	24501	4545
68	16751	1.799	30135	4545	0	34680	7805	16490	0	1464	25759	8921
69	16729	1.843	30832	8921	0	39752	11773	20066	0	1640	33479	6273
70	17098	1.794	30674	6273	0	36947	11806	20687	0	1749	34242	2705
71	17282	1.852	32006	2705	0	34712	11344	19610	0	1785	32739	1973
72	18488	1.870	34573	1973	0	36545	13048	19644	0	2224	34916	1629
73	22528	1.870	42127	1629	0	43756	14673	22353	0	2068	39094	4662
74	20777	1.593	33098	4662	0	37760	11450	19085	0	2093	32628	5132
75	21698	1.942	42138	5132	0	47270	15107	23545	0	1942	40594	6676
76	19992	1.754	35066	6676	0	41742	15351	21506	0	2078	38935	2807
77	23403	2.055	48093	2807	0	50900	19061	25220	0	2231	46512	4388
78	25764	1.974	50858	4388	0	55246	20117	27701	0	2648	50466	4780
79	28467	2.161	61517	4780	0	66297	23818	30573	0	2157	56548	9749
80	27443	1.783	48931	9749	0	58680	19712	27773	0	2673	50158	8522
81	26776	2.022	54141	8522	0	62663	25285	28032	0	2411	55728	6735
82	28102	2.121	59604	6935	0	66539	24634	30155	0	2368	57157	9382
83	25303	1.759	44508	9382	0	53890	20215	26753	0	2147	49115	4775
84	26755	1.893	50647	4775	0	55423	16279	28032	0	2513	46824	8599
85	24922	2.292	57121	8599	0	65720	20142	28658	0	2320	51120	14600
86	24084	2.271	54695	14600	0	69295	20684	29393	0	2468	52545	16750

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[1] Harvested acrage in 1,000 hectares; yields in mt/hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table 6. Production and Utilization of Soybean Meal in the United States, 1964-1986 (in 1,000 mt)

Year	Crush	Extrac Rate	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
64	12875	79.5%	10236	110	0	10346	1847	0	0	8405	10252	94
65	14761	79.3%	11705	94	0	11799	2360	0	0	9326	11686	113
66	15413	79.4%	12238	113	0	12351	2410	0	0	9815	12225	126
67	15579	79.5%	12385	126	0	12511	2630	0	0	9755	12385	126
68	16743	79.0%	13227	126	0	13353	2762	0	0	10455	13217	136
69	20223	78.9%	15956	136	0	16092	3661	0	0	12321	15982	110
70	20718	79.0%	16367	110	0	16477	4136	0	0	12217	16353	124
71	19548	79.0%	15443	124	0	15567	3452	0	0	11950	15402	165
72	19351	78.3%	15152	165	0	15317	4304	0	0	10862	15166	151
73	22683	78.7%	17852	151	0	18003	5033	0	0	12521	17554	449
74	19163	79.1%	15158	449	0	15607	3900	0	0	11387	15287	320
75	23881	78.8%	18818	320	0	19138	4667	0	0	14164	18831	307
76	21045	79.7%	16773	307	0	17080	4136	0	0	12751	16887	193
77	25751	78.8%	20292	193	0	20485	5516	0	0	14767	20283	202
78	27821	79.4%	22090	202	0	22291	5997	0	0	16075	22072	219
79	30728	80.0%	24582	219	0	24802	7196	0	0	17430	24626	176
80	27606	79.9%	22057	176	0	22233	6154	0	0	15958	22112	121
81	28037	79.7%	22345	121	0	22467	6266	0	0	16071	22337	130
82	30427	79.6%	24220	130	0	24349	6449	0	0	17515	23964	385
83	26181	78.9%	20657	385	0	21042	4862	0	0	15983	20845	197
84	28331	78.5%	22240	197	0	22437	4460	0	0	17672	22132	305
85	28740	78.8%	22647	305	0	22952	5450	0	0	17344	22794	158
86	29393	78.7%	23132	158	0	23290	5352	0	0	17690	23042	248

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table 7. Production and Utilization of Soybean Oil in the United States, 1964-1986
(in 1,000 mt)

Year	Crush	Extrac Yield	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
64	12875	18.1%	2330	262	0	2592	608	118	1652	83	2461	131
65	14761	17.8%	2627	135	0	2762	419	119	1913	105	2556	206
66	15413	17.9%	2759	210	0	2969	488	118	1984	106	2696	273
67	15579	17.6%	2742	270	0	3012	437	113	2081	130	2761	251
68	16743	17.7%	2964	245	0	3209	395	113	2391	120	3019	190
69	20223	17.7%	3579	188	0	3767	644	103	2657	123	3527	240
70	20718	18.1%	3750	246	0	3996	790	93	2622	139	3644	352
71	19548	18.3%	3577	351	0	3928	634	82	2726	133	3575	353
72	19351	17.6%	3406	356	0	3762	484	85	2825	130	3524	238
73	22683	18.0%	4083	234	0	4317	651	103	3061	139	3954	363
74	19163	17.5%	3354	360	0	3714	466	84	2753	148	3451	263
75	23881	18.3%	4370	254	0	4624	443	94	3359	159	4055	569
76	21045	18.5%	3893	567	0	4460	702	104	3151	151	4108	352
77	25751	18.1%	4661	350	0	5011	933	109	3457	186	4685	326
78	27821	18.5%	5147	331	0	5478	1059	110	3761	185	5115	363
79	30728	17.9%	5500	352	0	5852	1220	92	3853	129	5294	558
80	27606	18.5%	5107	549	0	5656	740	92	3906	136	4874	782
81	28037	17.8%	4991	787	0	5778	942	92	4143	90	5267	511
82	30427	18.0%	5477	500	0	5977	918	93	4211	168	5390	587
83	26181	18.8%	4922	572	0	5494	827	105	4194	51	5177	317
84	28331	18.4%	5213	327	9	5549	753	0	4498	0	5251	298
85	28740	18.3%	5259	287	4	5550	570	0	4560	0	5130	420
86	29393	18.3%	5379	430	0	5809	544	0	4718	0	5262	547

Source: USDA-FAS. Foreign Agricultura Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table 8. Supply and Demand for Wheat in the United States, 1960-1986 (in 1,000 mt)[1]

Mktg Yr	Year	Local Crop Year	Beg Stx 1000 Mt	Area Hrv 1000 Ha	Yield Q./Ha	Prod'n 1000 Mt	Total Supply 1000 Mt	Total Imports 1000 Mt	Total Exports 1000 Mt	Dom Feed 1000 Mt	Dom Food 1000 Mt	Total Usage 1000 Mt
60	60-61	(Jul-Jun)	35747	20995	17.6	36951	72698	215	17954	1155	15311	16466
61	61-62	(Jul-Jun)	38411	20871	16.1	33602	72013	150	19672	1268	15180	16448
62	62-63	(Jul-Jun)	38980	17681	16.8	29704	68684	140	17305	616	15388	16004
63	63-64	(Jul-Jun)	32529	18416	16.9	31123	63652	111	23104	214	16001	16215
64	64-65	(Jul-Jun)	24532	20139	17.3	34840	59372	37	19347	2485	15423	17908
65	65-66	(Jul-Jun)	22242	20057	17.9	35902	58144	24	23367	4389	15750	20139
66	66-67	(Jul-Jun)	14563	20078	17.7	35538	50101	40	19980	2727	15860	18587
67	67-68	(Jul-Jun)	11551	23615	17.4	41090	52641	20	20197	1757	15990	17747
68	68-69	(Jul-Jun)	14657	22163	19.1	42331	56988	25	14693	4496	15632	20128
69	69-70	(Jul-Jun)	22226	19080	20.6	39305	61531	81	16478	5819	15191	21010
70	70-71	(Jun-May)	26780	17630	20.9	36847	63627	27	19849	5307	16075	21382
71	71-72	(Jun-May)	22371	19293	22.8	43988	66359	27	16311	7076	16239	23315
72	72-73	(Jun-May)	26807	19135	22.0	42097	68904	27	30382	5634	16564	22198
73	73-74	(Jun-May)	16302	21813	21.3	46462	62764	82	32906	3729	16925	20654
74	74-75	(Jun-May)	9226	26548	18.4	48848	58074	82	27416	2068	17000	19068
75	75-76	(Jun-May)	11839	28126	20.6	57940	69779	54	31924	1034	18697	19731
76	76-77	(Jun-May)	18126	28692	20.4	58532	76658	82	25855	2041	18508	20549
77	77-78	(Jun-May)	30291	26993	20.6	55606	85897	54	30590	5253	18125	23378
78	78-79	(Jun-May)	32061	22965	21.1	48245	80306	27	32500	4327	18449	22776
79	79-80	(Jun-May)	25148	25275	23.0	58133	83281	54	37422	2341	18970	21311
80	80-81	(Jun-May)	24549	28727	22.5	64636	89185	82	41204	1388	19741	21129
81	81-82	(Jun-May)	26916	32635	23.2	75713	102629	82	48199	3619	19433	23052
82	82-83	(Jun-May)	31542	31540	23.9	75381	106923	190	41068	5307	19375	24682
83	83-84	(Jun-May)	41232	24844	26.5	65837	107069	112	38890	10206	20042	30248
84	84-85	(Jun-May)	38063	27085	26.1	70692	108755	256	38758	11022	20378	31400
85	85-86	(Jun-May)	38779	26197	25.2	66016	104795	408	24902	7457	20983	28440
86	86-87	(Jun-May)	51846	24560	23.1	56734	109580	272	26535	8845	21229	30074

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[1] Harvested acreage in 1,000 hectares; yields in quintals/hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

Appendix B. MARKETING INSTITUTIONS AND TRADE POLICIES
(Based on For. Ag. Econ. Report No. 78 and 162)

The National Institute for Agricultural Technology (INTA), was created in 1956 as an independent agency of the Federal Secretariat of Agriculture and was charged with conducting the nation's agricultural research and extension work. The Director General is responsible to a six-member Board of Directors. The president and vice-president of the board are appointed by the Secretary of Agriculture, three members represent farm associations, and one represents the eight national universities, the Colleges of Agriculture, and the schools of Veterinary Medicine.

The principal grain marketing institution is the Junta Nacional de Granos, or the National Grain Board (NGB), which is administered by a president and a vice-president chosen by the Secretary of Agriculture. The Secretaries of Commerce, Treasury, and Transport each designate one member to the board. For the other board positions, farm organizations designate nominees, and four are selected by the Secretary of Agriculture. One from each group represents producers' associations, farmers' cooperatives, industry, and the grain trade.

Grain production and marketing remain with private firms and cooperatives, but the JNG has control over them through its regulatory power and authority to set terms and conditions for sale of grains. Also the JNG administers the price support program for grains and oilseeds. Stocks of commodities acquired by the JNG are used to stabilize the domestic market. The JNG may also release these stocks to private firms to export. The JNG establishes domestic and export commodity grades and standards.

Recent Trading: The JNG was the sole seller of Argentina's grain in international markets from 1974 to mid-1976. The country favored multi-year bilateral trade agreements during this time. The responsibility for trade was returned to the private sector in 1976, although the government retains the role of negotiating bilateral agreements. Exporters are required to register their sales with JNG.

APPENDIX C-1

ARGENTINA
GRADING PROCEDURES[1]
CORN

Factor:	Procedure:
1. Broken Kernels	Shake 100 grams over a 4.25 mm round hole sieve 15 times. The material other than foreign material that passes through the sieve is considered brokens.
2. Foreign Material	All material other than corn that passes through the above sieve and all material other than corn remaining on top is considered foreign material.
3. Damaged Kernels	Is handpicked from the 100 gram portion and includes whole kernels and pieces of kernels. The interpretation of damaged kernels is much more rigid than the United States.

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[1] These were developed by R. Zortman through direct observations of inspection procedures. A more detailed and literal translation of the regulations are attached.

DESCRIPTION OF MAJOR GRADE FACTORS DETERMINING THE GRADE LEVELS FOR QUALITY IN ARGENTINA

CORN

(Act "J.N.G." No. 22.678, Dic. 1981)

BROKEN KERNELS

1. Definition (Article No. 8c)

   Shall be pieces of kernels of corn that passes through the sieve described in Article 10c of this Act.

2. Method of Determination (Article No. 10c)

   Shall be upon the basis of the sample grain after removal of the damaged corn and foreign matter. This work portion shall be placed on the sieve. On a flat and even surface, the sieve shall be alternatively moved backward and forward to complete 15 strokes. The material passing through the sieve constitutes the broken kernels.

3. Sample Size (Article No. 10)

   A 50 gram portion of the sample obtained through a sample divider shall serve in the determination of the quality levels for broken kernels.

4. Sieve to be Used (Article No. 10)

   a) Aluminum sieve 0.8 mm thick (0.1 mm). Round holes: 4.76 mm in diameter (0.013 mm). Practical diameter: 30 cm. Height 4 cm.
   b) Bottom: Aluminum 1 mm thick, diameter 33 cm, height 5 cm.

FOREIGN MATERIAL

1. Definition (Article No. 8b)

   Shall be kernels or pieces of kernels other than corn and all other inorganic matter.

2. Method of Determination (Article No. 10b)

   The sample portion shall be handpicked for foreign material.

3. Sample Size (Article No. 10)

   A 50 gram portion of the sample obtained through a sample divider shall serve in the determination of the quality levels of foreign material.

DAMAGED KERNELS

1. Definition (Article No 8a)

   Kernels or pieces of kernels of corn presenting visible alteration in their constitution and otherwise materially damaged. Considered as such are: sprouted, fermented, rotten, badly burnt, or moldy kernels.

2. Method of Determination (Article No. 10)

   The sample portion shall be handpicked for kernels or pieces of kernels showing damage.

3. Sample Size (Article No. 10)

   A 50 gram portion of the sample obtained through a sample divider shall serve in the determination of the quality levels for damaged kernels.

ARTICLE NO. 11: All results shall be expressed rounded up to the one-hundreth in percentage terms, relating the weight of the separated quality characteristic to the sample portion.

APPENDIX C-2

ARGENTINA
GRADING PRACTICES[1]
SOYBEANS

Factor:	Procedure:
1. Foreign Material	Shake 100 grams through a 4 mm round hole sieve 15 times. All material passing though except broken kernels of soybeans and all material other than soybeans remaining on top of the seive is considered foreign material. Foreign material includes the seed coats which are separated from the bean.
2. Broken Kernels (Splits)	All broken kernels regardless of size are handpicked from the above 100 gram portion and included in the separation of broken kernels.
3. Damaged Kernels	Are handpicked from the 100 gram portion and includes whole or broken (split) kernels. The interpretation of damaged kernels is much more rigid than in the United States. If a kernel is not almost perfect in color and shape, it is considered a damaged kernel.

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[1] These were developed by R. Zortman through direct observations of inspection procedures. A more detailed and literal translation of the regulations are attached.

DESCRIPTION OF MAJOR GRADE FACTORS DETERMINING THE GRADE LEVELS FOR QUALITY IN ARGENTINA

SOYBEANS

(Act :J.N.G." No. 23.882, March 1983)

BROKEN KERNELS

1. Definition

Shall be pieces of kernels of soybeans regardless of their size.

FOREIGN MATERIAL

1. Definition

Shall be kernels and pieces of kernels other than soybeans and all other inorganic matter, including the seed coats which are separated from the bean.

DAMAGED KERNELS

1. Definition

Shall be kernels or pieces of kernels of soybeans which show definite alteration in color, shape and/or normal texture externally and internally. Includes burnt kernels.

Sieve size and Method of Determination for discounts for "Datura Ferox" seeds in soybeanss:

1. Sieve to be Used

a) Steel sieve 0.75 mm thick, perforated with round holes 4 mm in diameter which are 6 mm apart from center to center. Practical diameter: 25 cm (+/-10%). Height minimum 3cm (+/-10%).

b) Bottom part: aluminum 0.8 mm thick - diameter 25 cm.

2. Method of Determination

A 100 gram portion of the original sample, obtained through the sample divider is placed on the sieve and on a flat and even surface it shall be alternately moved backward and forward as to complete 15 strokes. From the material remaining on top of the sieve, a representative 50 gram portion shall be used for the determination of the quality levels for damage, foreign material, and brokens or splits.

APPENDIX C-3

ARGENTINA
GRADING PROCEDURES[1]
WHEAT

Factor:	Procedure:
1. Broken Kernels	Shake 50 grams over a 1.6 milimeter by 9.5 milimeter slotted sieve 15 times. Material other than foreign material that passes through the sieve is considered brokens.
2. Foreign Materials	All material other than wheat that passes through the 1.6 mm x 9.5 mm sieve and all material other than wheat that remains on said sieve is handpicked and considered foreign matter.
3. Damaged Kernels	Handpicked from the 50 gram portion and includes whole kernels and pieces of kernels of wheat visibly altered in appearance or otherwise damaged. They are much more rigid on interpretation of damaged kernels than the U.S. Standards.
4. Moisture	Determined using at least two different moisture meters. Both Argentine made. One is called the Tesma A-79. It has a dump cell with butterfly, used 150 grams and equipped with a digital computer readout. Second is a Hygrometer IPA-H-6, operated on same principle as Motomco, but smaller, uses 170 grams.

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[1] These were developed by R. Zortman through direct observations of inspection procedures. A more detailed and literal translation of the regulations are attached.

DESCRIPTION OF MAJOR GRADE FACTORS DETERMINING THE GRADE LEVELS FOR QUALITY IN ARGENTINA

BREAD WHEAT

(Act "J.N.G." No.20.885, Nov. 1979)

BROKEN KERNELS

1. Definition (Article No. 11, Paragraph A)

Shall be kernels or pieces of kernels of wheat that passes through the sieve described in Article 3b of this same Act, excluding the kernels or pieces of kernels of wheat showing damage.

2. Method of Determination (Article No 4, Paragraph B)

The remainder of the sample wheat portion obtained in accordance to Article No. 2 shall be placed on a sieve like the one described below. The sieve is alternately moved backward and forward to complete 15 strokes. The wheat remaining on the bottom part of the sieve shall be weighed and the broken kernels expressed in percentage terms of the work sample.

3. Sample Size (Article No. 2, Paragraph B)

A 50 gram portion of the sample obtained through a sample divider shall serve in the determination of the quality levels for broken kernels.

4. Sieve to be Used (Article No. 3, Paragraph B)

Shall be a 1.6 mm. wide by 9.5 mm. long slotted sieve.

FOREIGN MATERIAL

1. Definition (Article No. 11, Paragraph A)

Shall be kernels or pieces of kernels other than bread wheat and all other inorganic matter.

DAMAGED KERNELS

1. Definition (Article No. 11, Paragraph A)

Kernels or pieces of kernels of bread wheat showing visible alteration in their constitution and otherwise materially damaged. Considered as such are heat damaged, green, frosted, sprouted, badly burnt, and insect damaged kernels.

Appendix D. Quality Characteristics of Corn and Soybean Samples from Argentina

Sample set 1

Four samples of corn from the outbound belt of JNG export elevator. Sampled with the Junta's device operated by R. Zortman, FGIS. It represents export quality from a small volume during loading of an ocean vessel.

Sample ID	Grade	Moisture	Test Weight	BCFM	Damage	Stress Cracks	Brk. Sus.
#1	2	14.4%	59.5	2.7%	0.9%	38%	30.4%
#2	3	14.5%	59.7	3.5%	1.8%	56%	37.4%
#3	2	14.5%	58.7	2.7%	2.2%	60%	31.4%
#4	2	14.2%	58.2	2.6%	1.9%	54%	35.0%

Sample set 2

Two samples of corn from farmers' trucks at harvest time standing in the delivery line at the starch plant in Chacabuco, Argentina. Sampled by their inspectors using grain probes.

Sample ID	Grade	Moisture	Test Weight	BCFM	Damage	Stress Cracks	Brk. Sus.
Pioneer 3183 (Dent)	1	15.8%	57.1	0.7%	1.5%	8%	9.2%
DeKalb 4F33	4	15.6%	58.9	0.3%	9.0%	6%	6.4%

Sample set 3

Samples of corn provided by country elevators in Rojas, Argentina.

Sample ID	Grade	Moisture	Test Weight	BCFM	Damage	Stress Cracks	Brk. Sus.
#12	2	14.8%	58.9%[1]	2.1%	3.1%	12%	11.2%
#13	1	15.4%	56.7%[1]	1.4%	1.4%	4%	17.8%

Sample set 4

Sample of corn from Rosario export elevator.

Sample ID	Grade	Moisture	Test Weight	BCFM	Damage	Stress Cracks	Brk. Sus.
Rosario export JNG	1	14.6%	n.a.	0.4%	0.5%	12%	9.1%

Sample set 5

Samples of wheat from inbound trucks delivering to the export elevator in Necochea. Samples used by the elevator to check for acceptability of delivery or criteria of insects and foreign material.

Sample ID	Grade	Moisture	Damage	FM	Shrunken and Broken	Total Defects	DHV Kernels	Protein
#1	No. 1, NSW	12.8%	0.0%	0.1%	1.4%	1.5%	73.0%	12.7%
#2	No. 1, NSW	11.9%	0.0%	0.0%	0.8%	0.8%	70.0%	11.5%

[1] Pint used for test weight

n.a. = non applicable due to insufficient amount for testing.

Appendix E. Example of the quality certificate issued by the JNG for an export shipment from Argentina.

024796

REPUBLICA ARGENTINA
JUNTA NACIONAL DE GRANOS
Dto. 6698/63

Certificado Argentino de Calidad
ARGENTINE QUALITY CERTIFICATE

GRANO
Grain

COSECHA
Crop

Certificado Nº
Certificate

Exportador ....
Shipper

Embarco en el puerto de .... El ....
Loaded at the port of .... on

En el vapor .... Bandera ....
Vessel .... Flag

Bodega .... con destino a ....
Hold .... destination

Peso total en kilogramos ....
Total weight

Granel Kg ....
in bulk

Embolsado, Kg ....
in bags

Bolsas ....
Bags

Marca ....
Marks

Este peso ha sido controlado por la Junta
This weight has been checked by the National

ANALISIS Nº
ANALYSIS

Nacional de Granos
Grain Board

Calidad (Quality) ....

....

....

....

Complementando este certificado de calidad, la Junta Nacional de Granos certifica:
Complementing this certificate of quality the National Grain Board certifies:

- Que el grano embarcado es de calidad comercial, sin ningún olor extraño
That the grain loaded is of commercial quality, without any unpleasant odor

libre de insectos vivos o gorgojos dañinos al grano almacenado y debidamente acondicionado.
as well as free from live insects or weevils harmful to stored grain and properly conditioned.

- Que las bodegas y escotillas han sido inspeccionadas habiéndose encontrado que las mismas están limpias, secas, libres de gorgojos y otros
That holds and hatches have been inspected, having found that they are clean, dry, free from weevils and other insects harmful to stored grain

insectos dañinos al grano almacenado y aptas para embarque.
and suitable for shipment

OBSERVACIONES ....
Remarks

....

....

....

ESTE CERTIFICADO ES EXTENDIDO POR LA JUNTA NACIONAL DE GRANOS DE ACUERDO A LAS FACULTADES OTORGADAS POR LA
THIS CERTIFICATE IS ISSUED BY THE NATIONAL GRAIN BOARD IN ACCORDANCE WITH THE SPECIFICATIONS STATED BY THE

LEY DE GRANOS ARGENTINA (DECRETO LEY 6698/63, ART. 9º inc. a) ARTS. 38º, 39º y 56º)
ARGENTINE GRAIN ACT. (Nº 6698/63)

LOS DATOS CONSIGNADOS EN ESTE CERTIFICADO REPRESENTAN LA CALIDAD, CONDICION, PESO Y CUALQUIER OTRA CARACTERISTICA
THE DATA CONTAINED IN THIS CERTIFICATE REPRESENT THE QUALITY, CONDITION AND WEIGHT OF GRAIN AND ANY OTHER CHARACTERISTIC

DEL GRANO A LA CUAL SE HAGA ESPECIAL REFERENCIA EN EL CERTIFICADO, AL MOMENTO Y LUGAR DE EMBARQUE
SPECIALLY REFERRED HEREIN AT THE TIME AND PLACE OF SHIPMENT.

DISTINTO AL DE EMBARQUE

LOS DATOS DE CALIDAD (GRADO) SE REFIEREN A LA MERCADERIA EN CONJUNTO, Y NO NECESARIAMENTE A LOS PARCIALES QUE
THE DATA OF QUALITY (GRADE) REFER TO THE GRAIN AS A WHOLE AND NOT TO THE LOTS OBTAINED THEREFROM

DE EL SE EXTRAIGAN

CUALQUIER RASPADURA O ENMIENDA INVALIDA ESTE DOCUMENTO.
ANY ERASURE OR CORRECTION RENDERS THIS DOCUMENT INVALID

Appendix F. The Argentine Seed Industry and Genetic Research

1. LEGAL CONTEXT OF THE SEED INDUSTRY IN ARGENTINA

The first attempt to regulate the seed industry in Argentina goes back to 1902 with Law 4084, to control the entrance of vegetables and seeds into the country. By 1930 the desire of the State to actively participate in seed control (development, production and marketing) culminated with the Grain Act of 1935 No. 12,253, which created the National Commission for Grains and Elevators (today National Grain Board). The Grain Act had a plan of comparative assays, which exist even today and serves the Council for Wheat Seeding.

Three important pieces of legislation currently affect the seed industry. The first is the Ministerial Resolution No. 841, SAG, 1959 which provides for "public pedigree" hybrids that are generally available to everyone and "closed pedigree" hybrids which allows private companies to sell hybrids without disclosing the inbred parent lines giving them de facto variety protection. Private seed companies indicate that in practice the patent and royalty regulations are difficult to enforce and often violated.

The second legislation is the Grain Act 20,247 established in 1978 to encourage creation of cultivars with self pollination such as wheat and soybeans where reproduction and distribution of variety cannot be controlled. This legislation is similar to the "Plant Variety Protection Act" enacted by the United States.

The institution in charge of enforcing the Grain Act 20,247 is the National Seeds Service, of the Secretariat of Agriculture and Stockbreeding (SAG), which in turn relies on the National Seeds Committee. This committee includes representatives of the private sector interests. This new Act introduced some essential changes from previous legislation, in the sense of including all crops and reducing the regulations for variety acceptance.

The new variety must be entered in the National Cultivar Register before it can be sold and distributed. The primary criteria for registration are "distinct, homogeneous and stable" (DHS). Distinct means the variety must be differentiable from other varieties; homogeneous means uniform characteristics of all plants in the variety; stable means that the variety characteristics must be reproducible in subsequent generations. Once the DHV of the variety is established the plant breeder may request property title. Title to the variety is awarded for 15 years (changed from 12 by 1987 legislation) for annual crops such as wheat and soybeans, and for 18 years for perennials and trees (changed from 20 years in 1987 legislation). Property titles are not given for first generation hybrids. Categories for "public pedigree" and "closed pedigree" are still in force.

The State cannot deny registration or property rights to anyone (in the sense of prohibiting production) as could the former

Controlling Tribunal. In this sense the Argentine regulations follow the spirit of U.S. legislation. However, government can appeal to two mechanisms in order to protect the farmers and the nation as a whole and prevent distribution of an undesirable variety. Act No. 20.247 (art. 15) states that the minister of agriculture has the power to "prohibit and require special norms temporarily or permanently, in all national territory, the production, diffusion, promotion and marketing of seeds, whenever it is considered convenient for specific agronomic or general interests." The number of protected varieties is about 170: 60 wheat, 35 soybeans, 10 open pollinated corn, 7 alfalfa, 3 rye grass, 3 broomcorn, 2 clover, and 3 other forage, 15 winter cereals, 11 flax, 4 rice, 2 tobacco and 9 potatoes and vegetables. Domestic companies control 130 of these property titles; foreign companies (primarily USA) control the other 40.

The Grain Act considers two categories of seeds: controlled and identifiable. The first category includes: original (obtained in the nursery); registered; (first multiplication); certified (second and third multiplication), obtained in seedbeds; and hybrids. Identifiable seed is common seed, not subject to the official control during its production cycle and sold under the merchant's responsibility. Merchants must be registered with National Register of Marketing and Control of Seeds. The relevant point in this legislation is the fact that it takes into account the previous underground marketing of seeds. Prior to this legislation grain intended for feed or processing could be cleaned by grain handlers and sold as seed.

The third area of legislation affecting plant breeding and new varieties is the Regime of Technology Transfer. The principal objective of these contracts is to provide technological knowledge and technological assistance associated with the development of original seeds for production of hybrid seeds.

These contracts were first regulated by the State in 1971 with Act 19.231, which created the National Contract Register for Licenses and Technology Transfer. Additional regulation was provided in 1974 with Act 20.794 with the objective of the evaluation and control of incorporated foreign technologies.

Beginning in 1977, a change took place when liberalization of the import technology market was granted through enactment of Act 21.617 or 1977, and 22.426 of 1981. With respect to this last Act, INTI (The National Institute for Industrial Technology, or Instituto Nacional de Tecnologia Industrial) was charged with the evaluation of the contracts that take place between linked companies (local enterprises that receive technology are considered linked when no less that 40% of shareholder capital belongs to the foreign enterprise providing technology). On the other hand, Act 22.426 does not limit the duration of the contracts, as was the case of previous Acts, in which the limit was 5 years. The purpose of these Acts is to control currency flow out of the country in payment for technology that could be developed locally.

A law for corn since 1975 and sorghum and sunflowers since 1979, stipulates that all marketing of seeds in the country are to be certified when the authorities determine that the supply of seeds mainly hybrids is sufficient. (Ministerial Resolution No. 628/79, SAG.)

2. DEVELOPMENT AND FUNCTIONING OF THE SEED INDUSTRY

Among the hybrids considered: (corn, sorghum and sunflowers) corn is the most important in the seed industry, representing one third of the value of the total seed production.

The first development of corn hybrids was done by the Ministry of Agriculture. In 1930, almost 30 years after the first research was carried out, it registered the first hybrid. During the following decade and up to 1959, when legislation on "private pedigree" was enacted, the public sector showed an increasing participation in the industry. New firms developed and others become subsidiaries of multinationals.

Widespread commercial use of hybrid corn in Argentina started in 1945 when the first double cross corn hybrids were distributed. During the 1949-59 period the relative importance of official hybrids "Abati 1 INTA" and "Abati 2 INTA" increased relative to privately produced hybrids. During the first part of the 1970's INTA hybrids were almost twice the total volume of the hybrid seeds produced by private firms. These hybrids have all but disappeared at the present time.

Four different groups have influenced the process of variety development: public agents, including the foreign universities and CIMMYT; private individuals; foreign enterprises; and multinationals. In the domestic market the major distributors are the INTA, the multinationals, and Argentine firms including Santa Ursula (created in the 50's) which actively participates in the process of phytogenetic research, particularly in corn. Historically Argentine varieties were were of the flint type. Development of new, higher yielding varieties required important adaptive breeding work to maintain flint characteristics. Most of the original hybrids were developed by INTA; by the mid-70's 80 percent of the private hybrids had at least one INTA line. Introduction of dent crosses has increased and semi-dents and pure dents are being grown in many areas of the corn belt.

An important aspect of the seed industry is the fact that a few corporations control a significant market volume of the hybrid seed. Less than 2 percent of the total hybrids are public. Most of the industries are subsidiaries of multinationals. The principal ones are: Cargill, Dekalb, Asgrow, Continental, Northrup King, Ciba-Geigy and Pioneer. There is only one domestic industry among the leading ones: Santa Ursula S. A. distributing varieties under the name of Morgan.

The structure and ownership of the firm distributing hybrid seed falls into three categories: 1. Firms that belong to large diversified corporations. Cargill and Continental, two of the five largest grain marketing firms, are also important distributors of seed. 2. Firms linked to pharmaceutical companies: Sandoz/Northrup King, Pfizer-Dekalb, Ciba-Geigy/Funks, and Upjohn/Asgrow. 3. Firms that are subsidiaries of large multinational seed companies such as Pioneer. 4. Domestic firms such as Santa Ursula.

Table 1 presents the three leading firms in the seed corn market for the last 10 years. In 1974 four of them produced 79% of total hybrid seed production, while in 1983, the percentage was 81%. In wheat there are about 50 cultivars. Most of these cultivars are distributed by INTA and Buck, an Argentine firm. Klein, another domestic company, also has a number of important cultivars.

Table 1. Market share of the hybrid seed industry.

Year	I	II	III	IV	V	Other
1974	57	7	8	7	--	21
1975	53	13	9	11	--	14
1976	54	16	8	8	--	14
1977	64	8	8	6	--	14
1978	58	20	5	8	2	7
1979	50	24	6	8	2	10
1980	47	24	8	7	4	10
1981	45	28	9	7	2	9
1982	31	32	19	7	6	5
1983	30	23	21	7	5	14
1984	30	27	21	8	-	14
1985	32	28	20	10	-	13

SOURCE: Made on the basis of hybrid inscription tags given to each firm. (Table from the study on the seed industry in Argentina. "La Industriade Semillas en Argentine," Martha Gutierrez.

At the turn of the century, the Ministry of Agriculture had major responsibility for R&D for new varieties of wheat. By 1960 most of the research was being done by INTA (Institut Nacional de Tecnologia Agropecaria). In the first part of the 1960s an International Cooperation Program was established among INTA, CIMMYT (Centro Internacional para el Mejoramiento del Maiz y el Trigo), the Ford

Foundation, and the private industry, Buck. It was during this period that the multinationals such as Dekalb, Cargill and Northrup King, became involved in hybrid seed production. Beginning in 1970 until the present, INTA has been the leading producer of new cultivars of wheat. The principal private seed producers are Buck and Klein.

The Development of the seed industry described above has been influenced by the changing legal system. The Grain Act of 1935 allowed the State to control seed production, while the Registration Regime for Cultivars recognized the rights of the creator of a new variety. This legislation was modernized in 1978, with the Act 20,247, similar to the Plant Breeders Rights (PBR) legislation. This Act was intended to protect the property rights of new cultivars and establish the payments of royalties. This Act had less impact than expected in encouraging the development of new varieties within the country.

3. THE ROLE OF GOVERNMENTAL INSTITUTIONS

The role of the public sector in the seed industry is represented by the INTA. Since mid-1970, its participation in genetic research has been decreasing. In 1973, INTA had 8 hybrids registered and in 1983, only 2. This situation is also reflected in the use by farmers of official hybrids: in 1965-70, 22% of total seed used was produced by INTA, while in 1975-80, this percentage was only 23%. This behavior corresponds to the decision of INTA not to produce commercial hybrids in competition with private firms (INTA Res. 310/79).

INTA traditionally had two mechanisms for reproducing original seeds. INTA can use its own resources for marketing, or provide foundation stock with production of the original seeds left in charge of cooperatives and farmers associations, producing and marketing the seeds under the direct supervision of INTA.

Since 1987 INTA changed their breeding and seed production approach, entering into joint ventures with domestic partners who provide financial resources for breeding and research programs.

Summary of the Information provided by Plant Breeders to the National Seeds Committee

A company intending to market a new variety must assemble the required test data and information on agronomic characteristics. This documentation is presented to the Seeds Committee to provide the technical information needed to fulfill the requirements for evaluation and approval of the new variety. The example presented to the team to illustrate the procedures included basic information on yields and productivity during a recent 3-year testing period.

Additional information included: 1. Description of the origin and process of selection for the cultivar; 2. Resistance to parasites and production of higher yield and better quality of flour; 3. The new variety of wheat was described as a medium to long-term cycle, 4. The optimal planting density was found to be 250 to 350 plants per square meter.

All data were obtained from tests conducted in "Criadero Necochea" and the results for this new cultivar were compared to those of five existing hybrids.

With respect to quality the tests included information on hectoliter weight (the new variety was superior); 1000 kernel weight; protein content; and baking characteristics. Baking characteristics included loaf volume and water absorption. These tests were performed by the Junta Nacional de Granos laboratories and by the firm submitting the new variety to the committee.

APPENDIX G. COMPARISON OF U.S. AND ARGENTINE TECHNOLOGY

Activity	United States	Argentina
	FARMER	
Soils and topography	Major production areas are on stable soils. Low erosion. Fertility stabilized. Soybeans usually incorporated in a rotation with corn or other crops.	Flat, fertile soils in the corn belt. Rolling land farther south in wheat and sorghum area. Long rotations including legume pasture.
Cultural practices	Fertilizer, insecticide, and herbicide used as needed. Mechanized soil preparation, seeding and cultivation.	Limited use of fertilizer on corn, increasing use on wheat. Limited use of herbicides and insecticides. Mechanized tillage seeding and cultivation.
Harvesting	Self propelled combine	Self propelled combines.
Storage	On-farm storage available for about 50 percent of corn and soybeans.	Only 5 to 10 percent stored on farms. Only very large farms use on farm storage.
	FIRST HANDLER	
Receiving	Truck dumps and hoists for virtually all farm wagons and trucks.	Truck dumps and hoists at larger facilities. A few receiving stations lack hoists. Waiting lines are common at harvest.
Drying	The majority of corn is dried and stored on farms. Most of the corn delivered at harvest is dried by first handler in gas fired driers. Little drying of soybeans or wheat.	Majority of corn and some soybeans and wheat are dried in high temperature dryers. Nearly all country elevators have driers. Usually oil fired.

APPENDIX H. COMPARISON OF GRAIN GRADING PRACTICES IN ARGENTINA AND THE UNITED STATES

Activity	United States	Argentina
	SAMPLER/INSPECTOR TRAINING AND QUALIFICATIONS	
Interior Elevator Samplers	On-job-training by elevator personnel. Qualifications none.	On-job-training by Junta trained inspectors. Qualifications -- license required but not enforced.
Interior Elevator Inspectors	On-job-training by elevator personnel.	10 month training course by Junta at one of three training locations. Licensed by Junta.
Export Elevator Official Samplers	On-job-training by official inspection personnel. Sampling conducted by FGIS employees or person licensed by FGIS.	On-job-training by official inspection personnel. Quality certificate must be signed by person licensed by the Junta.
Export elevator Inspectors	FGIS employee or licensee.	Junta employees.
	GRAIN HANDLING PRACTICES AT INTERIOR ELEVATORS	
Receiving	Received and placed in bin according to quality. Conditioning only to allow storage until corn or beans can be shipped.	All grain is conditioned to JNG moisture requirements in bins. Seldom segregated by grade factors.
Drying	High mosture grain is dried, especially if it is going to be stored. Moisture levels in storage and transit vary according to discounts, storage conditions, and future use. Different moisture levels may be blended prior to shipment.	All grain is dried to the levels set in the standards or below if storability require it. Corn 14.5%, Wheat 14.0%, Soybeans 13.0%. Discounts established by government decree.

Cleaning	Generally grain is not cleaned when it comes off the farm. It is placed in bins according to quality so that it can be blended with grains of different quality when loaded out.	Since there is a premium for No. 1 grain most grain is cleaned to less than 1.0% FM.
Storage	Generally stored in silo type bins segregated by quality, which expedites blending at time of loading and shipping.	Flat storge facilities predominate. Bins are seldom segregated by quality since most grain is clean and dry. Size and number of bins are not conducive to sophisticated blending.
Grading and Inspection	Quality is established by elevator personnel. Variety of sampling technology. Quality factors based on grade factors and crop conditions.	Quality is established by elevator personnel. Variety of sampling technology. Quality factors based on grade factors and crop conditions. All sales must meet condition Camara.
Screenings and FM	No incentives for farmers to clean grain below the market limit (3 percent for corn, (1 percent for soybeans). Elevators have an incentive to blend to the maximum limit on brokens and foreign material.	Premium for No. 1 corn creates an incentive for setting combines and cleaners to remove most of the screenings at the farm and the country elevator. Only one numerical grade for soybeans. They are cleaned to this grade.
Disposal of screenings	The feed market must compete for screenings with use in blending or commingling diverse qualities to meet No. 2 grade.	Generaly sold to feed manufacturers for animal feed. No evidence that screenings were used for blending.

Discounts	Price to farmers are discounted according to a scale for each factor.	Farmers are charged for putting grain into No. 1 condition, or may be discounted according to a government established schedule for each grade.

GRAIN HANDLING PRACTICES AT EXPORT ELEVATORS

Storage	Received and placed in bins according to grade factor. Grain is purchased according to numerical grade. Export quality is based on a variety of contracts.	Grain not meeting condition Camara is rejected. Generally not separated by quality because all meets condition Camara.
Drying	Many export facilities have large drying capacity and grain is often dried at export facility.	Since grain is dried by the first handler there is little need for driers at export elevators and they are rarely used.
Cleaning	Most export facilities have capacity for cleaning. Grain is often cleaned prior to exporting.	Since grain is cleaned by the first handler and since grain not meeting condition Camara is rejected there is little need for cleaning. Relatively small capacity cleaners.
Screening Disposal	Generally used to mix with grain at the time of loading to attain max. limits allowed for contracted grade. Excess sold to the feed industry.	Since grain received must meet Condition Camara there is little need to clean grain. When it is cleaned, it is used for animal feed or discarded.
Discounts to sellers	Based on schedule for each factor.	Delivery refused if out of grade.

SAMPLING AND INSPECTION SYSTEM: INBOUND-COUNTRY ELEVATOR

Regulation	Inspection is permissive. Grain Standards Act has no requirement for official sampling and inspection of grain delivered by the farmers.	JNG regulations require inspection of every load of grain.
Sampling and inspection	Elevator employees perform most sampling and analysis. Most loads are analyzed for most of the factors in the grades.	JNG requires that all sampling and analysis be done by licensed inspectors. Sampling is loosely enforced but all grade certificates must be signed by a licensed inspector.
Review and appeal	No review inspections are performed on elevator inspection, but a sample may be submitted to official agency.	Review inspection are provided. Samples in dispute may be sent to the Junta. A composite for each farmer is sent to the JNG. Random reviews provide checks plus information on crop quality.
Sampling equipment	Sampling methods used by elevator personnel vary from the "coffee can" technique to end gate sample, to multiple probes with compartmentalized or open throat trier to diverter type samplers. Samples drawn by an official agency use a compartmentalized trier or diverter sampler.	Samples were taken by compartmentalized probes in systematic pattern, hydraulic operated vacuum probes, and end-gate samples during unloading. A hydraulic operated bank of 3 vacuum probes was in use on trucks at one receiving station.

SAMPLING AND INSPECTION SYSTEMS: INTERELEVATOR MOVEMENTS

(Including Inbound to Export)

Regulation	Inspection is permissive, unless the soybeans are sold by U.S. grade.	Inspection is required. All grain is inspected by both the shipping and receiving elevator personnel.
Grade certification for shipment	Grain shipped between elevators may be of any grade including sample grade.	Grain shipped between elevators must meet Condition Camara -- Grade 1, 2, or 3 for corn; Grade 1 for soybeans.
Sampling equipment	Compartmentalized probe or diverter sampler	Compartmentalized probe or from grain stream as truck is unloaded.

SAMPLING AND INSPECTION SYSTEMS: EXPORT

Regulation	Law requires inspection by official inspection personnel on all export grain except as provided in certain cases by waiver.	Law requires inspection by official inspection personnel on all grain.
Vessel Examination	Vessel must be examined prior to loading for condition such as clean, dry and free of insects. Not more than two insects injurious to stored grain allowed.	Vessel must be examined prior to loading for condition such as clean dry, free of insects. If any insect is found vessel declared unfit to load.
Export Grain Quality	Any quality of grain may be exported that is agreed to under contract. Most U.S. exports are either grade 2 or 3. Elevator targets the limits for each factor, but average values are below maximums.	The JNG requires that all export grain must meet Condition Camara. Normally all grain grades No. 1 or 2. Lack of diverse qualities and bins limit the opportunity to blend to minimum quality of the standard. Average values are below maximums.

Sampling equipment	Diverter Sampler mandatory. Multiple samples mechanically drawn from the belt.	Small cup on stick. Grain sampled from belt as it moves to vessel.
Insect Examination	Examines 1250 grams from each 5,000 bu. loaded. Insect tolerance established by HB II.	Random examinations continuously during loading. If one insect is found, the entire ship hold that the grain went into must be fumigated.
Sample size	Numerous cuts of the diverter sampler are composited in sublots. Sublots of 18 to 60 thousand bu. are sampled and analyzed continuously during loading.	Sublot samples taken during each 6 hour shift are composited to represent the entire vessel.
Final grade basis	Weighted or mathematical average of all sublots is used to calculate values for the certificate.	One composite sample is constructed and graded to establish values for the certificate.
Quality control during loading.	Elevator personnel monitor continuously during loading and adjust the blend. Official results are reported to elevator personnel on each sublot during loading or before release from shipping bins.	Elevator personnel monitor quality and respond to problems. Official inspection personnel may stop the loading at any time grain does not meet the Condition Camara limits.
Tolerance on non-uniformity.	A statistically sound inspection plan (Cusum) is used which allows a specified tolerance beyond the contracted grade limits.	Control based on visual observation. No statistical control. Grading results on sublots are not available during loading.
Inbound grain quality at export elevators.	Permissive inspection. Elevator will generally accept grain, so long as it meets the grade purchased. Any grade may be purchased.	Inspection by JNG required. Inbound grain must meet Condition Camara.

Sampling equipment inbound.	Compartmentalized probe or diverter sampler.	Compartmentalized probe and from grain stream during unloading.
Location of sample analysis.	FGIS laboratory is located at the elevator. Analysis is conducted during loading. Results available shortly after the last sub lot is loaded.	All samples sent to JNG inspection laboratory in Buenos Aires. Results generally available within 24 hours after loading.
Inspection authority	FGIS, USDA	Junta Nacional de Granos
Certification	Quality and weight certificate is issued under the authority of FGIS, USDA.	Quality and weight certificate is issued by JNG.

Background Paper No. 2

A Comparison of the Quality Factors of the Brazilian and United States Grain Systems

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A COMPARISON OF GRAIN AND MARKETING IN BRAZIL AND THE UNITED STATES

EXECUTIVE SUMMARY

Soybean quality in Brazil is influenced by several regulations, agencies, and marketing practices, starting with a government-industry committee approving varieties for distribution. Quality in the context of intrinsic value is not an explicit criterion in approval of new varieties but oil and protein content are noted in the evaluation.

The majority of Brazilian soybeans are processed in Brazil by crushers whose capacity exceeds total production of soybeans. There is keen competition for available supply of beans, delivered to processors or elevator storage at harvest. Seasonal surpluses of soybeans move into the export market. Export taxes have been adjusted to equalize the profitability of exporting meal versus raw beans but the excess crushing capacity and local demand for oil makes it unlikely that Brazil will become a major exporter of raw beans.

Grading, inspection and issuance of export certificates are conducted by private inspection agencies, following specifications in the export contracts. Although state and federal governments have authority over grades and inspection, the quality factors generally used throughout the industry follow the export contract established by the trade organization ANEC.

Since nearly all soybeans leave the farm at harvest, drying and cleaning are done at the first handler in commercial channels at the farmers' expense in the form of direct charges or discounts. Thus most soybeans enter the market channel and storage in good condition. Strict enforcement of the export contract quality specifications in-bound to the port is an additional incentive for shippers to meet or exceed quality requirements.

Technology of production, harvesting, and marketing in Brazil is similar to that in the United States. A higher proportion of soybeans move to market at harvest time and are stored in larger commercial facilities than in the United States. The large flat storage facilities and simple grade standard reduces the incentive for blending.

Inspection in the country is conducted by employees of the local firm with occasional training beyond experience. Charge for cleaning and drying and discounts for split and damage are set by competition and reflect processor and export preferences. Sampling methods are less sophisticated especially at the port, but the end result of the system is uniformly clean and dry shipments of soybeans. Data from other studies also indicate a higher oil content in Brazilian beans than in U.S. exports.

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A COMPARISON OF GRAIN GRADING AND MARKETING IN BRAZIL AND THE UNITED STATES

An Interim Report to Office of Technology Assessment

By Lowell D. Hill

Argentina, Brazil and the United States compete in many of the same world markets for corn, wheat and soybeans. They are major producers of feed grains and oilseeds as well as large consumers of these grains and processed products. The relative positions of these three countries in world production and export markets have changed over the past twenty years. In general these changes have resulted in a weakening of the United States' position in international markets.

The causes of the shifts in market shares are many and have been described and analyzed in many publications.[1] In addition to policies, exchange rates, over valued U.S. currency and high U.S. grain prices, the marketing practices, market institutions, and delivered quality differ among these three countries and must be included in a list of explanatory variables. Understanding these differences and their relationship to market shares will help to assess the strengths and weaknesses of the U.S. system, providing a basis for recommending policy changes.

OVERVIEW OF THE 3-COUNTRY GRAIN INDUSTRY

Corn

The three countries of Brazil, Argentina and the United States accounted for 51.3 percent of world production in 1986/87; about the same as in 1975, but 12.8 percentage points higher than the twenty year low of 38.5 percent in 1983 (Table 1). This low point was the result of the combination of the US PIK program and the 1983 drought. The United States dominates world production accounting for over 40 percent in every year since 1970, with the exception of 1983.

Production in Brazil increased by 85.7 percent between 1964 and 1986; from 12.1 mmt in 1964 to 22.5 mmt in 1986 (Table 2). Domestic use during this period has grown from 10.4 mmt to 23 mmt with a generally upward trend especially in domestic feed use. Feed and industrial use (domestic other) are small relative to direct consumption for food. Domestic consumption on the average is equal to production in Brazil so that exports are highly variable with crop conditions. Exports have varied from 0 to 12 percent of total usage, and in some years, domestic requirements can obly be met by importing soybeans (Table 3).

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[1] An analysis and bibliography is provided in USDA, ERS, Embargoes, Surplus Disposal and US Agriculture, AER No. 564, Washington D.C., Dec. 1986.

Table 1. Production and export of corn as a share of world totals - United States, Brazil and Argentina, 1970 - 1986/87

World Production Shares (in %)

Year	1986/87	1985/86	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	43.8	53.1	42.5	43.3	30.5	46.8	46.2	42.6	45.7	40.4
Brazil	5.5	4.2	4.8	4.7	5.4	4.8	4.7	5.1	5.0	5.4
Argentina	2.0	2.5	2.5	2.1	2.6	2.1	2.9	1.6	2.4	3.6
	51.3	59.8	49.8	50.1	38.5	53.7	53.8	49.3	53.1	49.4

World Export Shares (in %)

Year	1986/87	1985/86	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	65.6	57.6	69.8	71.2	69.0	69.9	69.1	78.6	65.3	49.4
Brazil	N/A	N/A	N/A	0.3	1.1	0.8	<0.1	<0.1	2.2	5.0
Argentina	9.5	13.5	10.5	8.0	9.5	7.5	11.5	4.3	7.6	17.9

Sources: 1970-1984: FAO Production Yearbook, various years, Rome: FAO Trade Yearbook, various years, Rome.

1984/85-1986/87: USDA-FAS, World Grain Situation and Outlook, Circular Series FG-6-87, May 1987.

Table 2. Production and Utilization of Corn in Brazil, 1964-1986
(in 1,000 mt)[1]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Dom Feed	Dom Oth	Ttl Dom Use	End Stx	Local Mktg Year
64	8771	13.8	12104	2006	7	14117	560	6240	4167	10407	3558	65/66
65	8703	13.1	11401	3558	5	14964	621	5805	5898	11703	2610	66/67
66	9274	13.8	12798	2610	8	15416	430	6695	4367	11062	4010	67/68
67	9584	13.4	12843	4010	3	16856	1253	6245	5167	11412	4162	68/69
68	9654	13.1	12647	4162	1	16810	650	6505	7141	13646	2320	69/70
69	9858	14.4	14196	2320	1	16517	1798	6710	5990	12700	2049	70/71
70	10550	13.4	14137	2049	1	16187	948	9330	3909	13239	1993	71/72
71	10539	14.1	14860	1993	4	16857	172	12470	3946	16416	300	72/73
72	9908	14.2	14069	300	0	14369	42	9660	3907	13567	800	73/74
73	11262	14.5	16330	800	0	17130	1311	12210	3063	15273	500	74/75
74	10800	15.1	16308	500	0	16808	968	11640	3946	15586	300	75/76
75	11200	16.0	17920	300	0	18220	1511	12674	3500	16174	500	76/77
76	11800	15.9	18762	500	0	19262	2000	13500	3538	17038	1000	77/78
77	10700	12.7	13589	1000	1750	16339	0	13700	2550	16250	100	78/79
78	11317	14.4	16296	100	1476	17872	0	14900	2900	17800	86	79/80
79	11621	17.4	20221	86	2000	22307	0	17600	3600	21200	1100	80/81
80	12810	17.6	22546	1100	0	23646	7	18500	3800	22300	1348	81/82
81	13382	17.1	22883	1348	0	24231	700	18500	3535	22035	1545	82/83
82	11050	17.6	19448	1545	500	21493	450	17700	3095	20795	300	83/84
83	12700	16.5	20955	300	440	21695	385	17300	3500	20800	555	84/85
84	12000	18.3	21960	555	1100	23615	56	18000	4444	22444	1155	85/86
85	12250	16.3	19968	1155	2000	23123	0	18000	4500	22500	655	86/87
86	12700	17.7	22479	655	1300	24434	0	18500	4500	23000	1434	87/88
87												88/89

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[1] Harvested acreage in 1,000 hectares; yields in quintals per hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

Table 3. Exports and Domestic Use of Corn as a Share of Total Domestic Supplies - United States, Brazil, and Argentina, 1964-1986
(in %)

	Exports as % Total Usage			Domestic Use as % Total Usage		
	Arg	Brazil	U.S.	Arg	Brazil	U.S.
64	53%	5%	14%	47%	95%	86%
65	57%	5%	15%	43%	95%	85%
66	52%	4%	11%	48%	96%	89%
67	52%	10%	14%	48%	90%	86%
68	54%	5%	12%	46%	95%	88%
69	59%	12%	13%	41%	88%	87%
70	70%	7%	11%	30%	93%	89%
71	34%	1%	15%	66%	99%	85%
72	57%	0%	21%	43%	100%	79%
73	54%	8%	21%	46%	92%	79%
74	47%	6%	24%	53%	94%	76%
75	53%	9%	29%	47%	91%	71%
76	61%	11%	29%	39%	89%	71%
77	63%	0%	31%	37%	100%	69%
78	64%	0%	30%	36%	100%	70%
79	53%	0%	32%	47%	100%	68%
80	71%	0%	33%	29%	100%	67%
81	62%	3%	29%	38%	97%	71%
82	65%	2%	25%	35%	98%	75%
83	58%	2%	28%	42%	98%	72%
84	64%	0%	27%	36%	100%	73%
85	62%	0%	19%	38%	100%	81%
86	62%	0%	17%	38%	100%	83%

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

The United States still produces more than 40 percent of the total world corn production (Table 1) with year-to-year variations associated with weather and government policies. Domestic feed use in the United States has fluctuated with prices and livestock inventory. Industrial use (domestic other) has shown steady growth (Table 4). Carry-over stocks are often an important factor in the United States market with inventory levels 100 to 300 times those of Argentina and Brazil. As a result, exports as a percent of total usage ranged from a low of 11 percent in 1970 to a high of 33 percent in 1980 (Table 3).

Domestic consumption in Brazil is approximately equal to supply; in the United States it has varied around an average of 78.3 percent of total supply with no clear historical trend; in Argentina, domestic use has fluctuated around an average of 42.3 percent of total supply with a general upward trend (Table 3). It is clear that corn exports have been of no significance in Brazil. The export market is of major importance in the United States' production, but fluctuations in production and exports have been cushioned by government storage and changes in stocks.

Soybeans and Soybean Meal

The United States dominates world production of raw soybeans, accounting for about 60 percent of total world production (Table 5). Other major producers in 1986/87 were Brazil (17%), Argentina (7.5%), and PRC (11%). United States production of 19.1 mmt in 1964 (Table 6) was nearly forty times that of Brazil-.5 mmt (Table 7). Both countries made dramatic increases in the next twenty years. The United States increased production from 19.1 mmt in 1964 to 54.7 mmt in 1986, an increase of 286.7 percent in this 23 year period. During this same period, Brazil's production increased from 523,000 mt to 16,201,000 mt, an increase of nearly 3,000 percent.

Exports of soybeans from the United States increased steadily through 1981. The pattern changed, and between 1981 and 1986 exports fluctuated from 16.3 mmt to 25.3 mmt (Table 6). In contrast, Brazilian exports fluctuated dramatically over the entire period, with no discernable trend (Table 7). The percent of usage exported as raw soybeans between 1965 and 1976 is similar for the United States and Brazil, fluctuating around a 12 year average of 26.5 percent for Brazil and 33.3 percent for United States (Table 8). However this pattern changed for Brazil in 1977 when exports as a percent of use dropped below 20 percent and reached a minimum of 6 percent in 1978, 1979, and 1982. The contrast between the export patterns of Brazil and the United States is the result of Brazil's emphasis upon domestic crushing capacity.

In both countries, the percent of supply processed annually followed a similar pattern up through 1971 with total crush ranging from 47 to 73 percent in Brazil, and 48 to 62 percent in the United States (Table 7). However, after 1977, a significant change is evident in Brazil's strategy with respect to domestic crush and export of raw beans. While Brazil increased its percentage of supply processed domestically to 84 percent in 1982, the U. S. continued to

Table 4. Production and Utilization of Corn in the United States, 1964-1986[1] (in 1,000 mt)[2]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Dom Feed	Dom Oth	Ttl Dom Use	End Stx	Local Mktg Year
64	22408	39.5	88512	39040	26	127578	14241	75344	8849	84193	29136	64/65
65	22417	46.5	104239	29136	22	133397	16738	86077	9181	95258	21379	65/66
66	23069	45.9	105887	21379	22	127288	12138	84792	9344	94136	20988	66/67
67	24563	50.3	123552	20988	23	144563	15546	89732	9506	99238	29685	67/68
68	22655	49.9	113048	29685	33	142766	13301	91253	9780	101033	28407	68/69
69	22086	53.9	119044	28407	27	147478	15549	96310	10098	106408	25533	69/70
70	23213	45.4	105387	25533	102	131022	12854	91303	10102	101405	16840	70/71
71	25920	55.3	143338	16840	32	160210	19868	101505	10190	111695	28600	71/72
72	23238	60.9	141519	28600	24	170143	31536	109478	11169	120647	18010	72/73
73	25050	57.3	143537	18010	25	161572	31242	106508	11457	117965	12269	73/74
74	26467	44.8	118572	12269	51	130892	28922	81056	11695	92751	9169	74/75
75	27357	54.2	148275	9169	51	157495	43459	91516	12446	103962	10160	75/76
76	28935	55.2	159721	10160	76	169957	42774	91669	13030	104699	22504	76/77
77	28976	57.0	165163	22504	70	187737	49479	96114	13995	110109	28219	77/78
78	29109	63.4	184551	28219	26	212796	54178	110947	14605	125552	33122	78/79
79	29300	68.8	201584	33122	26	234732	61798	114783	17149	131932	41073	79/80
80	29555	57.1	168759	41073	25	209857	59817	105131	18673	123804	35361	80/81
81	30159	68.4	206288	35361	28	241677	51043	105887	20250	126137	64432	81/82
82	29429	71.1	209240	64432	18	273690	46580	114830	22730	137560	89490	82/83
83	20835	50.9	106050	89490	69	195609	48300	96976	24764	121740	25561	83/84
84	29103	67.0	194990	25561	89	220640	47383	104541	26789	131330	41866	84/85
85	30442	74.1	225575	41866	279	267720	31523	104805	28678	133483	102618	85/86
86	28000	74.9	209720	102618	76	312414	28576	109225	29230	138455	145383	86/87

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[1] Data for 1980 and subsequent years is based on September-August year.

[2] Harvested acreage in 1,000 hectares; yields in quintals per hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

Table 5. Production and export of soybeans as a share of world totals - United States, Brazil, and Argentina, 1970-1986/87.

World Production Shares (in %)

	1986/87[1]	1985/86[2]	1984/85	1984	1983	1982	1981	1980	1975	1970
United States	54.6	59.1	54.4	56.3	56.1	66.6	61.5	60.3	55.6	65.9
Brazil	17.0	14.4	19.6	17.3	18.4	13.8	16.9	18.7	17.8	3.2
Argentina	7.5	7.5	7.3	7.5	5.0	4.3	4.3	4.3	1.1	<0.1

World Export Shares (in %)

	1986/87[1]	1985/86[2]	1984/85	1984	1983	1982	1981	1980	1975	1970
United States	72.2	77.4	64.5	77.0	85.5	88.3	83.4	81.0	75.9	93.7
Brazil	9.5	4.6	13.8	6.1	4.9	1.7	5.5	5.8	20.3	2.3
Argentina	9.5	9.8	13.0	12.1	5.4	6.5	8.5	10.0	<0.1	n.a.

[1] As of May 1987

[2] Preliminary

Sources: 1965-1984: FAO Production Yearbook, Various years, Rome, FAO Trade Yearbook, Various years, Rome

1984/85-1986/87: USDA-FAS. World Oilseed Situation and Market Highlights. Circular Series FOP 5-87, May 1987.

Table 6. Production and Utilization of Soybeans in the United States, 1964-1986 (in 1,000 mt)[1]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Crush	Food	Fd/Sd	Ttl Usage	End Stx
64	12462	1.531	19079	1832	0	20911	5774	13036	0	1290	20100	811
65	13941	1.651	23017	811	0	23828	6820	14628	0	1404	22852	976
66	14790	1.709	25276	976	0	26252	7119	15225	0	1442	23786	2466
67	16109	1.650	26580	2466	0	29046	7255	15687	0	1559	24501	4545
68	16751	1.799	30135	4545	0	34680	7805	16490	0	1464	25759	8921
69	16729	1.843	30832	8921	0	39752	11773	20066	0	1640	33479	6273
70	17098	1.794	30674	6273	0	36947	11806	20687	0	1749	34242	2705
71	17282	1.852	32006	2705	0	34712	11344	19610	0	1785	32739	1973
72	18488	1.870	34573	1973	0	36545	13048	19644	0	2224	34916	1629
73	22528	1.870	42127	1629	0	43756	14673	22353	0	2068	39094	4662
74	20777	1.593	33098	4662	0	37760	11450	19085	0	2093	32628	5132
75	21698	1.942	42138	5132	0	47270	15107	23545	0	1942	40594	6676
76	19992	1.754	35066	6676	0	41742	15351	21506	0	2078	38935	2807
77	23403	2.055	48093	2807	0	50900	19061	25220	0	2231	46512	4368
78	25764	1.974	50858	4368	0	55246	20117	27701	0	2648	50466	4780
79	28467	2.161	61517	4780	0	66297	23818	30573	0	2157	56548	9749
80	27443	1.783	48931	9749	0	58680	19712	27773	0	2673	50158	8522
81	26776	2.022	54141	8522	0	62663	25285	28032	0	2411	55728	6935
82	28102	2.121	59604	6935	0	66539	24634	30155	0	2368	57157	9382
83	25303	1.759	44508	9382	0	53890	20215	26753	0	2147	49115	4775
84	26755	1.893	50647	4775	0	55423	16279	28032	0	2513	46824	8599
85	24922	2.292	57121	8599	0	65720	20142	28658	0	2320	51120	14600
86	24084	2.271	54695	14600	0	69295	20684	29393	0	2468	52545	16750

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[1] Harvested acrage in 1,000 hectares; yields in mt/hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

Table 7. Production and Utilization of Soybeans in Brazil, 1965-1987 (in 1,000 mt)[1]

Year	Area Harv	Yield	Prod	Beg Stx	Imp	Ttl Supply	Exp	Crush	Food	Fd/Sd	Ttl Usage	End Stx
65	432	1.211	523	56	0	579	75	282	0	49	406	173
66	491	1.212	595	173	0	768	121	395	0	61	577	191
67	612	1.170	716	191	0	907	305	423	0	72	800	107
68	722	0.906	654	107	0	761	66	471	0	89	626	135
69	906	1.167	1057	135	0	1193	310	612	0	130	1052	141
70	1319	1.144	1509	141	0	1650	290	932	0	169	1391	259
71	1716	1.210	2076	259	1	2336	230	1700	0	277	2207	129
72	2840	1.291	3666	129	5	3800	1023	2132	0	362	3517	283
73	3615	1.386	5010	283	5	5299	1788	2714	0	513	5015	284
74	5143	1.531	7874	284	6	8164	2862	4302	0	603	7767	397
75	5824	1.698	9889	397	0	10286	3516	5516	0	677	9709	577
76	6417	1.750	11230	577	0	11807	3328	6374	0	748	10450	1357
77	7070	1.770	12514	1357	0	13871	2581	8661	0	825	12067	1804
78	7782	1.226	9541	1804	89	11433	659	8782	0	938	10379	1054
79	8256	1.240	10237	1054	253	11545	638	9094	0	895	10627	918
80	8774	1.727	15153	918	474	16544	1533	13009	0	920	15462	1082
81	8501	1.788	15200	1082	934	17216	1502	13796	0	890	16188	1028
82	8202	1.565	12836	1028	1252	15116	797	12728	0	895	14420	696
83	8136	1.813	14751	696	34	15481	1316	12873	0	1069	15258	223
84	9421	1.650	15545	223	154	15922	1580	12517	0	1147	15244	678
85	10153	1.800	18275	678	428	19381	3456	13774	0	1156	18386	995
86	9166	1.462	13401	995	350	14746	1200	11900	0	1056	14156	590
87	9300	1.742	16201	590	50	16840	1800	13400	0	1200	16400	440

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[1] Harvested acreage in 1,000 hectares; yields in mt/hectares.

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

Table 8. Exports of Soybeans as a Share of Total Domestic Supplies - United States, Brazil, and Argentina, 1965-1986 (in %)

Mktg Year	Percent of Usage Exported as Soybeans			Percent of Meal Usage Exported			Percent of Oil Usage Exported		
	Arg	Brazil	U.S.	Arg	Brazil	U.S.	Arg	Brazil	U.S.
1965	0%	18%	29%	0%	62%	18%	0%	0%	25%
1966	0%	21%	30%	0%	77%	20%	0%	0%	16%
1967	0%	38%	30%	0%	46%	20%	0%	0%	18%
1968	0%	11%	30%	0%	71%	21%	0%	0%	16%
1969	0%	29%	30%	0%	75%	21%	0%	0%	13%
1970	0%	21%	35%	0%	85%	23%	0%	2%	18%
1971	0%	10%	34%	0%	84%	25%	0%	2%	22%
1972	0%	29%	35%	0%	96%	22%	0%	10%	19%
1973	0%	36%	37%	9%	68%	28%	81%	16%	14%
1974	0%	37%	38%	6%	72%	29%	70%	2%	16%
1975	0%	36%	35%	37%	81%	26%	23%	31%	14%
1976	16%	32%	37%	66%	83%	25%	79%	35%	11%
1977	46%	21%	39%	70%	81%	24%	66%	35%	17%
1978	69%	6%	41%	70%	79%	27%	53%	32%	20%
1979	77%	6%	40%	52%	72%	27%	96%	26%	21%
1980	75%	10%	42%	50%	73%	29%	78%	35%	23%
1981	63%	9%	39%	71%	79%	28%	45%	45%	15%
1982	50%	6%	45%	92%	80%	28%	73%	37%	19%
1983	34%	9%	43%	94%	79%	27%	80%	38%	17%
1984	44%	10%	41%	93%	80%	23%	97%	37%	16%
1985	44%	19%	35%	92%	80%	20%	92%	37%	14%
1986	35%	8%	39%	92%	73%	24%	87%	16%	11%
1987	34%	11%	39%	93%	74%	23%	87%	22%	10%

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights. Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

Table 9. Volume of soybeans processed as a percent of total domestic supplies - United States, Brazil and Argentina, 1964-1987. (in %)

Year	United States	Argentina	Brazil
1964	62.3	N/A	N/A
1965	61.4	35.3	48.7
1966	58.0	17.9	51.4
1967	54.0	11.9	46.6
1968	47.5	19.3	61.9
1969	50.5	19.7	51.3
1970	56.0	24.7	56.5
1971	56.5	30.3	72.8
1972	53.8	29.9	56.1
1973	51.1	53.6	51.2
1974	50.5	44.6	52.7
1975	49.8	66.8	53.6
1976	51.5	54.3	54.0
1977	49.5	36.0	62.4
1978	50.1	23.0	77.7
1979	46.1	16.6	78.8
1980	47.3	18.8	78.6
1981	44.7	29.2	80.1
1982	45.3	43.5	84.2
1983	49.6	55.7	83.2
1984	50.6	49.4	78.6
1985	43.6	49.0	71.1
1986	42.4	58.6	80.7
1987	N/A	59.3	79.6

Sources: Calculated from USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights. Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

fluctuate around the same magnitude as in the previous period. Argentina's pattern during this period falls between the extremes of Brazil and the United States--fluctuating over a wide range between 1965 and 1981 but generally similar to the U.S. pattern between 1982 and 1987. Between 1978 and 1987, Brazil never processed less than 71 percent of its production. In contrast, the U. S. never processed more than 51 percent and Argentina never over 60 percent. The increased proportion of the Brazilian crop used by domestic crushers shifted Brazil from an exporter of beans to a major force in the world meal market.

Brazil's exports of meal reflect this shift in emphasis from exporting raw beans to exporting processed meal. Brazil's production of meal and oil increased at a very high rate, especially prior to 1980. U.S. production has also increased sufficent to exceed Brazil's total output, but the relatively rapid growth of oil and meal production in Brazil reflects policy actions to encourage growth in processing capacity (Appendix Table A1-A4). While Brazil increased its share of the world soybean meal market from 3.7 percent in 1965 to 34.0 percent in 1986/87, the United States dropped from 70.2 percent to 25.5 percent (Table 10). Brazil has a dominant position in the world markets for soybean meal and their exports reflect an explicit government decision supported by policy. They have followed strategies that have resulted in total crush capacity that exceeds annual production in most years, shifting their comparative advantage to meal exports rather than raw beans.

The shifts in market shares can also be demonstrated by converting the exports of meal and soybeans to the meal equivalent. Assuming a constant conversion of 0.79 mt of meal from every ton of raw beans provides a market share comparison that is independent of domestic vs. foreign processing allocation. Brazil's 1985/86 share of 19.5 percent of international trade in beans and meal combined leaves the United States the dominant force in world markets with just over 1/2 of world exports. Brazil shows considerable year-to-year variation in market share with highs above 20 percent in 1975, 1981, and 1984/85 (Table 11).

Destinations of soybean and soybean meal exports reveal competition for the same major markets by both countries. Western Europe has been a major market accounting for 44.9 percent of U.S.' exports of raw beans in 1985/86, and 83.6 percent of Brazil's (Table 12). Exports to the USSR from both countries has been quite variable. Japan accounts for a very small and intermittent proportion of the Brazil exports but is a large and stable customer for U.S. soybeans.

In the case of soybean meal exports, Western Europe provides the largest market for both exporting countries. East European countries are important markets for Brazil but of almost no importance as a destination for United States exports. Direct and vigorous competition for meal markets is most evident in Western Europe. Secondary markets for each country have little overlap (Table 13).

Table 10. Market shares of world soybean meal[1] exports - United States, Brazil and Argentina, 1965-1986/87
(in %)

	1986/87[2]	1985/86[3]	1984/85	1984	1983	1982	1981	1980	1975	1970	1965
U.S.	25.5	24.1	20.0	22.0	28.4	30.9	31.6	39.4	42.3	68.0	70.2
Brazil	34.0	32.4	37.9	37.4	37.1	39.5	44.3	37.0	35.1	9.8	3.7
Argentina	13.9	13.9	12.9	12.7	6.9	4.9	2.6	1.6	1.6	N/A	N/A

[1] 1965-1985 soybean cake and meal
[2] as of May 1987
[3] preliminary

Sources: 1965-1984: FAO Trade Yearbook, various years, Rome.
1984/85-1986/87: USDA-FAS. World Oilseed Situation and Market Highlights. Circular series FOP 5-87, May 1987.

Table 11. Market shares of world soybean and soybean meal[1] exports in meal equivalent - United States, Brazil and Argentina, 1970-1986/87
(in %)

	1986/87[2]	1985/86[3]	1984/85	1984	1983	1982	1981	1980	1975	1970
U.S.	53.1	55.6	46.2	55.1	69.2	67.8	63.8	66.7	65.8	87.3
Brazil	19.5	16.0	23.7	18.1	16.6	15.1	20.2	16.5	24.7	4.2
Argentina	11.3	11.5	13.0	12.3	5.6	5.9	6.2	7.1	0.5	N/A

[1] For 1970-1984
[2] As of May 1987
[3] Preliminary

Sources: 1965-1984: FAO Trade Yearbook, various years, Rome.
1984/85-1986/87: USDA-FAS. World Oilseed Situation and Market Highlights. Circular series FOP 5-87, May 1987.

Table 12. Major Destinations of Soybeans Exported from the United States and Brazil, 1975/76 to 1985/86[1]

(in 1,000 mt/% of total)

United States

Dest. Year	W. Europe	Japan	Taiwan	USSR	Mexico	S. Korea	Others	Total
1975/76	8,899 (59.1)	3,248 (21.6)	789 (5.2)	310 (2.1)	13 (0.1)	99 (0.7)	1,692 (11.2)	15,050
1976/77	8,391 (55.4)	3,070 (20.3)	731 (4.8)	825 (5.4)	399 (2.6)	154 (1.0)	1,585 (10.5)	15,155
1977/78	10,997 (55.9)	3,798 (19.3)	927 (4.7)	744 (3.8)	580 (2.9)	248 (1.3)	1,392 (12.2)	19,686
1978/79	10,581 (52.4)	3,884 (19.2)	142 (0.7)	1,178 (5.8)	575 (2.8)	439 (2.2)	3,395 (16.8)	20,194
1979/80	13,276 (55.7)	3,877 (16.3)	810 (3.4)	813 (3.4)	845 (3.5)	473 (2.0)	3,739 (15.7)	23,833
1980/81	10,646 (53.3)	3,849 (19.3)	1,043 (5.2)	0 (0)	855 (4.3)	467 (2.3)	3,112 (15.6)	19,972
1981/82	15,731 (61.7)	4,184 (16.4)	1,050 (4.1)	683 (2.7)	334 (1.3)	552 (2.2)	2,943 (11.6)	25,477
1982/83	13,910 (56.7)	4,679 (19.1)	1,403 (5.7)	199 (0.8)	901 (3.7)	701 (2.9)	2,729 (11.1)	24,522
1983/84	9,055 (47.2)	4,234 (22.1)	1,316 (6.9)	416 (2.2)	1,303 (6.8)	707 (3.7)	2,167 (11.3)	19,198
1984/85	7,642 (46.0)	4,115) (24.8)	1,392 (8.4)	0 (0)	1,165 (7.0)	714 (4.3)	1,593 (9.6)	16,621
1985/86	9,050 (44.9)	4,290 (21.3)	1,506 (7.5)	1,519 (7.5)	860 (4.3)	954 (4.7)	1,960 (9.7)	20,139

[1] U.S. fiscal years = October-September; Argentina = April-March

[2] Includes countries not reporting.

[3] 1975/76 "exports" were less than 1,000 mt. No single data available.

Sources: U.S.: 1975/76-1982/83: USDA-ERS, U.S. Foreign Agricultural Trade Statistical Report, Fiscal Years, Various Issues - 1983/84-1985/86: USDA-ERS, Foreign Agricultural Trade of the United States, Fiscal Years, Various issues.

Table 12. (continued) Major Destinations of Soybeans Exported from the United States and Brazil, 1975/76-1985/86[1]
(in 1,000 mt/% of total)

Brazil

Dest. Year	W. Europe	Japan	PR China	USSR	Mexico	Iraq	Others[2]	Total
1975	2,727	44	32	438	---	---	92	3,333
	(81.8)	(1.3)	(1.0)	(13.1)	(0)	(0)	(2.8)	
1976	1,966	125	25	1,162	122	10	229	3,639
	(54.0)	(3.4)	(0.7)	(31.9)	(3.4)	(0.3)	(6.3)	
1977	1,551	60	309	552	70	24	21	2,587
	(60.0)	(2.3)	(11.9)	(21.3)	(2.7)	(0.9)	(0.8)	
1978	565	2	19	32	---	40	43	659
	(85.8)	(0.3)	(2.9)	(4.9)	(0)	(6.1)	(6.5)	
1979	506	1	17	45	---	24	45	638
	(79.3)	(0.2)	(2.7)	(7.1)	(0)	(3.8)	(7.1)	
1980	1,332	40	---	118	42	---	17	1,549
	(86.0)	(5.6)	(0)	(7.6)	(2.7)	(0)	(1.1)	
1981	697	5	---	497	218	---	33	1,450
	(48.1)	(0.3)	(0)	(34.3)	(15.0)	(0)	(2.3)	
1982	46	---	---	255	178	---	22	501
	(9.1)	(0)	(0)	(50.9)	(35.5)	(0)	(4.4)	
1983	952	54	---	128	116	---	45	1,295
	(73.5)	(4.2)	(0)	(9.9)	(9.0)	(0)	(3.5)	
1984	1,169	---	---	---	347	---	45	1,561
	(74.9)	(0)	(0)	(0)	(22.2)	(0)	(2.9)	
1985	2,874	212	---	---	22	---	383	3,491
	(82.3)	(6.1)	(0)	(0)	(0.6)	(0)	(11.0)	
1986	1,001	114	n.a.	n.a.	n.a.	n.a.	83	1,198
	(83.6)	(9.5)	---	---	---	---	(6.9)	

[1] U.S. fiscal years = October-September; Argentina = April-March
[2] Includes countries not reporting.
[3] 1975/76 "exports" were less than 1,000 mt. No single data available.

Sources: U.S.: 1975/76-1982/83: USDA-ERS, U.S. Foreign Agricultural Trade Statistical Report, Fiscal Years, Various Issues - 1983/84-1985/86: USDA-ERS, Foreign Agricultural Trade of the United States, Fiscal Years, Various issues. Brazil: 1975-1985: Unpublished Brazilian tables (CACEX). 1986: USDA-FAS: Brazil Annual Oilseeds Report. Unpublished, February 27, 1987.

Table 13. Major destinations of soybean meal[1] exported from the United States, and Brazil, 1975/76-1985/86[2]
(in 1,000 mt/% of total)

United States

Year	W.Europe	Canada	Venezuela	Poland	Mexico	Japan	Other[3]	Total
1975/76	3,077	278	84	361	7	120	740	4,667
	(65.9)	(6.0)	(1.8)	(7.7)	(0.1)	(2.6)	(15.9)	0
1976/77	2,521	329	128	257	190	217	548	4,190
	(60.2)	(7.9)	(3.1)	(6.1)	(4.5)	(5.2)	(13.1)	0
1977/78	3,284	339	114	493	95	271	920	5,516
	(59.5)	(6.1)	(2.1)	(8.9)	(1.7)	(4.9)	(16.7)	0
1978/79	3,342	414	244	243	91	204	1,458	5,996
	(55.7)	(6.9)	(4.1)	(4.1)	(1.5)	(3.4)	(24.3)	0
1979/80	4,029	356	329	400	148	210	1,703	7,175
	(56.2)	(5.0)	(4.6)	(5.6)	(2.1)	(2.9)	(23.7)	0
1980/81	3,294	331	374	312	187	154	1,497	6,149
	(53.6)	(5.4)	(6.1)	(5.1)	(3.0)	(2.5)	(24.3)	0
1981/82	4,134	340	518	N/A	33	N/A	1,241	6,266
	(66.0)	(5.4)	(8.3)	0	(0.5)	0	(19.8)	0
1982/83	4,281	401	464	N/A	203	N/A	1,100	6,449
	(66.4)	(6.2)	(7.2)	0	(3.1)	0	(17.1)	0
1983/84	2,469	428	527	278	69	8	1,152	4.931
	(50.1)	(8.7)	(10.7)	(5.6)	(1.4)	(0.2)	(23.4)	0
1984/85	1,764	490	686	117	106	4	1,290	4,457
	(39.6)	(11.0)	(15.4)	(2.6)	(2.4)	(0.1)	(289)	0
1985/86	2,643	607	543	0	81	46	1,530	5,450
	(48.5)	(11.1)	(10.0)	0	(1.5)	(0.8)	(28.1)	

[1] Figures prior to 1981/82 include oilcake and meal.
[2] U.S. fiscal years = October-September.
[3] Includes countries not reporting.

Sources: U.S.: 1975/76-1982-83: USDA-ERS. U.S. Foreign Agriculture Trade Statistical Report, Fiscal Year, various issues. 1983/84-1985/86: USDA-ERS. Foreign Agricultural Trade of the United States, Fiscal Year, various issues.

Table 13. (continued) Major destinations of soybean meal[1] exported from the United States, Brazil, 1975/76 through 1985/86, (in 1,000 mt/% of total)

Brazil

Year	W.Europe	Poland	Hungary	E.Germany	Japan	Iran	Other[3]	Total
1975	1,890	320	112	9	16	0	772	3,119
	(60.6)	(10.3)	(3.6)	(0.3)	(0.5)	(0)	(24.8)	
1976	2,792	214	180	33	72	0	1,065	4,356
	(64.4)	(14.9)	(4.1)	(0.8)	(1.7)	(0)	(24.4)	
1977	3,420	456	121	150	81	0	1,101	5,329
	(64.2)	(10.5)	(2.8)	(2.8)	(1.5)	(0)	(17.1)	
1978	4,042	269	53	2	67	0	974	5,407
	(74.8)	(5.0)	(1.0)	(0)	(1.2)	(0)	(18.0)	
1979	3,594	605	131	0	54	0	787	5,171
	(69.5)	(11.7)	(2.5)	(0)	(1.0)	(0)	(15.2)	
1980	4,463	806	212	20	89	149	843	6,582
	(67.8)	(15.6)	(4.1)	(0.3)	(1.4)	(2.3)	(12.8)	
1981	5,335	925	353	177	100	170	1,824	8,884
	(60.1)	(10.4)	(4.0)	(2.0)	(1.1)	1.9	(20.5)	
1982	4,322	282	366	397	49	248	2,057	7,721
	(55.0)	(3.7)	(4.7)	5.1	0.6	3.2	(26.6)	
1983	5,051	0	465	324	210	43	2,400	8,493
	(59.5)	(0)	(5.5)	(3.8)	(2.5)	(0.5)	(28.3)	
1984	4,674	248	474	699	92	94	1,306	7,587
	(61.6)	(3.3)	(6.2)	(9.2)	(1.2)	(1.2)	(17.2)	
1985	7,011	251	256	166	102	87	715	
	(81.6)	(2.9)	(30)	(1.9)	(1.2)	(1.0)	(8.3)	
1986	4,872	587	153	157	N/A	127	483	6,379
	(76.3)	(9.2)	(2.4)	(2.5)		(2.0)	(7.6)	

[1] Figures prior to 1981/82 include oilcake and meal.
[2] Includes countries not reporting.

Sources: Brazil: 1975-1985: Unpublished Brazilian tables
1986: USDA-FAS. Brazil Annual Oilseeds Report.
Unpublished Report, February 27, 1987.

Wheat

Wheat production in Brazil has been small compared to production in the United States, but the rate of increase between 1970 and 1986 has been much greater. Brazilian production increased from 1.7 mmt in 1970 to 5.3 mmt in 1986 -- over a 3-fold increase (Appendix Table A5). However, Brazil's wheat consumption far exceeds production with imports supplying nearly half of total consumer needs (Appendix Table A6). Brazil is a customer, not a competitor in United States wheat markets (Appendix Table A7).

Policies and economic forces responsible for the contrasting Brazilian patterns relative to the United States are beyond the scope of this report. The importance of the observed differences among countries lies in the influence which the differing strategies have on incentives, and the quality of the final product delivered into the domestic and export markets. A description and comparison of the major technologies, market channels, pricing strategies and grading practices in each country will provide the background for a comparison and analysis of the quality delivered into the domestic and export markets of each country.

THE BRAZIL SOYBEAN INDUSTRY

Overview

Most of the soybeans in Brazil are produced in the two States of Rio Grande do Sul and Parana (Table 14). Mato Grosso and Mato Grosso do Sul have increased to tie for second place. Rio Grande do Sul has been producing soybeans for many years and has more problems of disease and soil fertility than the newer areas farther north. However, the northern areas such as Mato Grosso do Sul and Mato Grosso have been recently cleared and are experiencing increasing problems of erosion. In the southern states, the small farms are becoming smaller as inheritances are divided. Yields decline due to the increased double cropping which requires shorter season varieties and less than optimum timing in planting. Currently, yields in Rio Grande do Sul are about 70% of those in Parana. Double cropping in Rio Grande do Sul is at the margin for sufficient season length to mature both crops. Farther north the longer season which allows more double cropping and produces wheat yields of about 3,000 kilograms per hectare under irrigation. The returns justify installation of irrigation systems for wheat. During the dry season, the land is then ready for soybeans as the rainy season starts. If the rain is delayed, the irrigation system is in place, at minimal cost, to give the soybeans a good start as well. For these reasons, the northern expanding areas have a potential for increasing average yields and total production in Brazil. Erosion is a problem in these new lands, but considerable efforts are being made to control that erosion. Erosion is more serious than in Rio Grande Do Sul where few efforts are being made on the small farms to control erosion. Government policies and educational programs are oriented toward increased terracing and crop rotations as a means of reducing erosion and maintaining longer term productivity.

Table 14. Production of soybeans in Brazil, by state, 1985-1987

(in 1,000 mt)

	1985	1986	1987 (Forecast)
Rio Grande do Sul	5711	3400	1987
Parana	4413	2850	5300
Sao Paulo	960	918	870
Sta. Catarina	564	498	470
M. Grosso do Sul	2559	1965	2300
Minas Gerais	883	779	820
Goias	1356	1128	1000
Mato Grosso	1656	1921	2250
Bahia	76	140	100
Other	100	101	110
Total	18278	13700	17000

SOURCE: Brazil Government, trade and office estimates.

Yields have also increased as results of improved varieties. As an example, twenty years ago they were fortunate to obtain 65 bags for 2.4 hectares. They are now harvesting 100 bags from 2.4 hectares. The oil and protein content have declined as yields increased. Average oil content twenty years ago was 20.5%, now it is closer to 18.5%. No attention is paid to these quality characteristics in the selection of seed. Yield is the primary concern and in many cases the only criterion.

Production and Marketing Technology

Technology of production and cultural practices in Brazil are quite parallel to those of the United States. The same equipment manufacturers and the same types of combines, tractors and cultivators are seen in the Brazil soybean fields as one would find in the Midwest of the United States. The transfer of technology by private firms from the United States is rapid and effective. Farmers' knowledge of production practices also appears to be equal to that of U.S. farmers. There is a wide range of farm sizes and with it a wide range of production costs and efficiency. Estimates of production costs for Brazil are difficult to generalize because of the diversity of farm sizes and types. Much of the soybean production is found in specialized cropping areas and soybeans do not appear to be grown in any systematic rotation in the state of Parana. In areas farther south double-cropping of soybeans following wheat is an important rotational practice.

Technology of handling, drying and storage in the country is generally similar to that of the United States with some exceptions. Little on-farm storage exists in Brazil, requiring that nearly all soybeans be delivered into the market channel at harvest. This requires storage capacity in the market channel sufficient to absorb most of the crop at the time of harvest. With large crops of corn and soybeans in the same year, pressure on storage capacities may force exports of raw grain into the market channel even though it may be re-imported later in the season. The lack of on-farm drying and storage have an important influence on marketing and pricing strategies which will be discussed later in this section. Most of the storage capacity for soybeans at country elevators and processing plants is provided by large flat buildings of metal, block, or concrete and/or steel bins. The vertical concrete silos with multiple bins so common in the United States are less frequent.

Much of the harvest arrives at 14 to 18 percent moisture levels requiring drying, usually to 13 percent. Grain dryers are very common at every country elevator and processing plant. Nearly all of these dryers are fired with wood and some of the larger firms are integrated into production and processing of wood and fuel for their dryers. The cost of handling and the labor involved in fueling grain dryers with logs seems large but given the relative cost of wood and fossil fuels, wood is obviously an economically viable alternative.

Grain handling equipment, dump pits, legs and belts were all similar to those of the elevators and processors in the United States. Truck hoists were less frequently seen than in the United States and limited to the larger facilities. At smaller elevators the large straight trucks were often unloaded by hand without the benefit of hoists.

Flat storage facilities varied in design but several had belt or chain conveyors below the floor and tractors were used to move grain to the conveyor after bin levels dropped below the gravity feed. Metal bins and some of the small concrete block silos were equipped with augers. Portable augers were also in evidence. Cleaners were nearly always available for inbound grain but were seldom needed on outbound. The interviewees reported that cleaning outbound even from flat storage was seldom needed to meet the 1 percent limit on FM.

The public elevator in Paranagua (the major port for loading whole beans) reported 70,000 mt capacity in flat storage and 100,000 mt in concrete upright silos. The high speed handling facilities of the public elevator relied on vertical storage, belt conveyors, and 4 shiploaders with a combined capacity of 6,000 mt per hour. Inbound dump pits were capable of handling 1,000 trucks per day. The four shiploaders from the public elevator load ocean vessels at two berths . They operate around the clock. Several firms in the port use the public warehouse pool. In addition, Sanbra, with storage capacity of 70,000 mt, has a ship loading capacity of 680 mt per hour at another berth. Soccepar has 2 shiploaders with 450 mt per hour at a third berth. They load primarily pellets. Cargill has separate storage (40,000 mt) but uses two of the shiploaders at one berth from the public elevator storage to the shiploaders. We could not determine the exact configuration of the handling facilities other than to confirm the use of vertical legs and belts.

Transportation in Brazil from farm to market to export point is primarily by truck. Although rail is available, it appears to be relatively inefficient and does not account for much of the long haul from the State of Mato Grosso do Sul and Mato Grosso where railroads have not been built or do not connect the important production and consumption points. For example, beans from Mato Grosso may be transported over 1500 miles to the port at Paranagua. Rail facilities are not available for transporting these beans, therefore the highways are heavily stressed with large trucks making long hauls to the port and the processing plants in the major processing regions of the country. The location of the ports and the export-directed flow of the raw and processed products require large quantities of transportation services. There was evidence of congestion in truck deliveries with waiting lines at country elevators, processing plants, and port elevators.

Technology at port facilities is also modern in most instances with high speed belts and legs. In general, there are relatively few bins available for separate storage, even at the port. Flat storage and large silos were common, providing less opportunity for blending diverse qualities segregated into separate bins according to quality.

Marketing Channels and Practices

Nearly all beans are delivered direct from the farm to the first handler at harvest time. Most go through a country elevator but many go directly to a processing plant. A high proportion of these beans must be artificially dried and farmers have neither drying nor storage facilities on farms. All the conditioning is therefore conducted at the first handler, i.e. the country elevator or the processing plant. Soybeans are also delivered direct to processors where they are put into storage in the condition the processor desires for processing.

Since up to 95 percent of annual production goes into Brazilian soybean processing plants, the market channel is directed towards supplying these plants with their monthly crush requirements. Many of the older and smaller plants are unable to maintain this flow through the market channel and operate only during a relatively short season as a result. Those with adequate storage or access to country elevator storage are able to generate 80 to 85 percent of their rated capacity. The strategy is to fill storage space as rapidly as possible at harvest time and then to feed this into the crushing plant at a uniform rate. Soybean exports are more seasonal in Brazil than in the United States with the harvest time surplus moving into the export channel. Bean exports are therefore concentrated in a relatively short season with over 75 percent of Brazil's annual exports moving into world markets between April and August, and over 90 percent by September following spring harvest. In contrast, cumulative exports from the United States follow a uniform monthly pattern with an almost constant percent exported each month (Figure 1). Most deliveries from producing areas to the port are transported by trucks. The highway system is severely taxed during the harvest period with long hauls to ports as well as processors. Most of the newly developing production areas do not have crushing facilities and even domestic destinations may require truck transport of over 1,000 miles.

The meal market is oriented toward export with 73 percent of 1986 production of meal going into the export market. This emphasis controls not only crushing rates and margins but transportation and facilities as well.

In general the cooperatives consider themselves as brokers for the farmers. Although they may technically take title to the grain, they do not consider themselves merchandisers. This is a technical issue. When they sell back to back (i.e. an off-setting sale is made simultaneously with the purchase), they consider it as a brokerage activity. Income is derived primarily from, a) discounts and drying charges, b) commissions, c) storage income, d) charges for related services. Limited blending was reported by several country elevators, but blending was clearly not a major source of income to grain handlers

Organization of the Industry

The processing and exporting firms are a mixture of cooperatives, independent private firms, and multinationals. All of the major multinational grain companies are involved in some phase of assembly, processing and marketing grain. A large share of the processing and local assembly is done by cooperatives. Several of the cooperatives are organized into regional and national entities providing coordination from input supplies to final products and into many agriculturally related products.

ABIOVE, the Trade Association of Oil Processors reported slightly more than 80 active soybean processors in the industry in Brazil in 1987. The Trade Association is relatively young, having been in operation for only about 5 years, however, it appears to be quite active in lobbying and influencing political decisions as well as in servicing trade related problems.

Brazil's crushing industry was characterized by many small scale plants in the late 1960's and early 1970's. But expansion of crush capacity in the late 1970's and early 1980's has created an industry dominated by large (1,200-2,000 mt/day) modern plants. The plants are concentrated in the states of Parana and Rio Grande do Sul. New soybean acreage in Mato Grosso do Sul and Mato Grosso place additional stress on the transportation system for moving soybeans to processors or to ports. Technology of processing in the newer plants is identical to that of the United States, relying on the solvent extraction process. Many plants are integrated into production of final products packaged for retail at the same plant location as the receiving truck dump for raw soybeans.

Marketing Practices and Pricing Strategies of Producers

The lack of farm storage results in virtually all soybeans being delivered directly from the field to elevators or processing plants. In some cases, they may be delivered direct from farm to the port, but the majority of the soybeans delivered to the ports are sold through a local cooperative or private elevator and delivered in the elevator's name. Some beans are sold direct in the farmer's name, but this would be true only for the larger farmers.

There are several merchandising opportunities open to the farmer, although not as many as in the United States. Cooperatives provide management advice and pricing information. In general the producers have five marketing options available.:

1. They sell at the spot or current bid price and receive payment immediately (usually means within 48 hours).

2. "A-Fix-A" and similar programs with different names are a form of the "delayed price" concept used in the United States. Under this program, the farmer receives an advance (the amount varied from 40 percent to 70 percent of the value among the elevators interviewed) on which the farmer pays interest until at a day of his choosing, he prices his soybeans at the elevator. He has from six to twelve months in which to price. Different buyers set different time limits and most agreed that the limit was negotiable. Some buyers indicated that they would negotiate across crop years, although sellers seldom wanted

to delay pricing that long. This "A-Fix-A" grain is sometimes bid lower than the posted bid at the time of pricing to compensate for storage costs. Most elevators did not have a specific charge for "price later" or "delayed price contracts".

3. Farmers may sell on a deferred price agreed upon at the time of delivery with payment to be made at the deferred date. For example, the soybeans might be delivered in April with price set according to a July price, with payment made in July.

4. Farmers may store the grain at an agreed upon storage cost at the country elevator and sell at their option at a later time.

5. Farmers may sell to the government at the established minimum price, with delivery to a country elevator or a public warehouse. Payment is made at time of delivery.

Of the five alternatives, the "A-Fix-A" concept is the one most extensively used. Some elevators and processors reported as much as 80-85 percent of their receipts were purchyased on "A-Fix-A". The government minimum price was not effective in most of the State of Parana because the market price in general was above the minimum or at least the realized market price was above the realized minimum price offered by the government. In areas more remote from the processing plants and export ports, the government minimum price was much more attractive because of transportation costs. The minimum price is identical throughout all of Brazil. In distant areas the freight costs to the port or processing plant were sufficiently high to make the minimum price more attractive.

The farmers' marketing strategies are heavily influenced by the economic situation in Brazil and by the personal financial picture of the individual farmer. In most cases an immediate sale is necessary, or at least an advance against the "A-Fix-A", in order to pay off operating loans. Inflation and high interest rates have put the farmer in a financial squeeze and with low prices, he has no choice but to obtain early payment for the soybeans in order to repay loans and credit extended by the marketing firms or banks.

At the country elevator, hedging is virtually non-existent. Several reported that hedging was illegal; others, that government regulations made it extremely difficult; others stated that hedging was illegal except for that portion of the grain that would eventually be exported. Regardless of the degree of government control over hedging or the legality, almost none of the merchandisers or processors were hedging their purchases of beans. It was almost universally agreed that no long position would be allowed on the Chicago Board of Trade, primarily because of the government's need to control currency movement between the U. S. and Brazil. Hedging was not important to most elevators because they either sold immediately after purchase, back to back, or acted as brokers. Thus, their risk was minimized in terms of future price changes. The rapid inflation rate also minimizes the danger of losses through purchases of grain, since there is an almost continuous price increase over time.

Prices for soybeans at the port or in the central merchandising offices in Sao Paulo are generally expressed in U. S. dollars. The prices are quoted in terms of cents over or under the Chicago Board of Trade. In the country the price is derived by backing off fobbing costs, freight, estimated shrinkage, brokerage and taxes and is quoted to the local farmer in Brazilian cruzados. The value of soybeans in Brazil is determined by export values, processor needs, marketing costs and the influence of government minimum prices for raw beans as well as for oil at the retail level.

Government Policies

Several government policies have a direct or indirect effect upon the quality of soybeans in the domestic and export market. The Government minimum price is administered by Comissao de Financiamento da Producao (CFP) and announced prior to planting in order to encourage production of the major crops. This price is adjusted during the year to account for inflation and in response to political pressures. This is in contrast to U.S. policy administered by ASCS where price is fixed prior to harvest and remains unchanged. Government officials in Brasilia indicated some problems with their adjustment policy; primarily political pressure to change prices beyond the automatic inflation adjustment. The government is also involved in setting maximum prices for the vegetable oil in order to maintain internal supplies at reasonable prices for consumers. If the farmer chooses to sell to the Government, the Government takes title, pays the farmer through the elevator and in four to six months auctions off the inventory by closed bid at the various locations where grain is stored. Storage must be in Government-approved warehouses. The Government pays storage to the elevator for the inventory which they hold for the Government. The Government disposes of all of the grain it owns through the public auction route, so that it does not carry inventory across crop years.

Corn and soybeans eligible for price support and storage, require guarantees of quality, going into storage as well as periodically during storage. There is no federal agency with inspection capability. The Brazilian Warehouse Act (Law 1102, November 11, 1903) transferred the authority for inspecting storage warehouses to the individual state governments. Only CFP and the financial agents of CFP inspect warehoused grain. The Bank of Brazil is conscientious in this inspection since the grain is pledged to them as collateral for loans by the bank to CFP. In the State of Parana CFP contracts with CLASPAR for inspecting and grading grain before delivery or shipment.

Imposto Sobre Circulacao de Mercadoria (ICM) is the major tax influence on Brazil soybean exports. The literal translation is "tax on circulation of merchandise." This is a value added tax and is organized so that it is a percentage of the increase in value between the purchase of a product and its sale. Most inputs such as fertilizers and herbicides do not have a tax. Grain and grain products are almost always taxed but these taxes differ between locations. For example, if a crusher buys soybeans in Sao Paulo, he pays the ICM tax immediately. If he sells inside the state, he must pay a 15% tax. If he buys in one state and receives in another state across the state line, he only pays 12%. If the soybeans are moved to the second state for crushing, and the meal is sold inside the state, the crusher pays the difference between 17 and 12. If the meal is exported, then the tax rate changes again. Cooperatives do not pay the tax when they receive and sell soybeans because they are considered to be the farmer's agents and not actually merchandising. The tax is organized and regulated at the national level but the funds are given to the individual states. Sometimes this is reallocated down to the county but the funds do not go into the national coffers. States must all adhere to the national percentage but there is still some flexibility in the administration. For example, some states allow payment of the tax to be delayed as much as 30-90 days, thus providing benefits to the firms who wait for devaluation of currency as well as receiving interest on the unpaid tax. This is consistent with the calculations demonstrated by the large cooperative, COAMO, where the manager included interest on the ICM tax as part of his income in determining margins and payments to producers.

"Soybean export restrictions were imposed in 1973, providing the domestic crushing industry first access to the soybean crop while improving crush margins by depressing the domestic soybean price. A state value-added tax (ICM) also was levied on exports of soybeans and products." [Gary Williams and Robert Thompson, AJAE, Nov. 1984, p. 489] The export restrictions have been lifted and CACEX currently requires only that sales be licensed.

Taxes on raw beans, meal and oil have been adjusted in recent years so as to equalize the relative profitability among the raw beans and the two major products. The ICM tax is 11.1 percent on the meal, 8.0 percent on the oil and 13.0 percent on raw beans. The tax on the raw beans is assessed against the fob-price minus freight costs. Meal and oil are taxed at their wholesale values; including assembly and processing costs of raw beans used by the processor. Processors and exporters were convinced that under present price relationships, the taxes provided equal penalty for all forms of exports of soybeans and soybean products.

A government agency, known as CACEX has responsibility for export licenses, quotas, and credit. CACEX is an independent agency within the bank of Brazil. It is a political agency with their director appointed by the Minister of Finance or in some cases, by the President himself. It is therefore a very high level government agency with power to control imports and exports within the import and export bank of Brazil. They handle most products, grain being one of many. Another organization with a broad range of influence in Brazilian exports and grading standards is Conselho Nacional Do Comercio Exterior (CONCEX). Concex is not a government agency, but is made up of an association of private traders and government agencies. It is a board of exporters acting in an advisory capacity. The resolutions which they pass establishing grades for corn and soybeans is a resolution of that board, not an official government resolution. They have considerable power as an advisory group to CACEX but do not carry governmental authority within their own organization.

In addition, the Ministry of~~ Agricult~~ure has established a separate set of standards for corn and soybeans for domestic trade. The domestic grades come from the Minister of Agriculture. The direct translation of the opening sentence is "By the powers I have under law ______, I approve the following specifications for the marketing of soybeans and grains." These then carry the weight of government as official grades for domestic transactions but apparently are not enforced within commercial channels. The federal government has no direct role for inspecting or analyzing grain quality. State agencies evidently have responsibility for inspection of products crossing state lines but implementation on grain was sporadic at best. CLASPAR is an example of these state agencies from the State of Parana. The CLASPAR inspection brochure states that the grades have been developed in cooperation with the Minister of Agriculture. These are official documents but they do not follow the national or CONCEX grades and enforcement in commercial channels seems to be optional.

QUALITY CONTROL IN BRAZIL

There are no objective data to verify the differences in quality between soybeans from United States and Brazil origins. Limited data from foreign processors have indicated that soybeans from Brazil have a higher oil and protein content, lower foreign material, and lower moisture; but they also have lower test weight and problems with oil quality due to the presence of red dust. Data provided by the Japan soybean processing association provide the only known historical series. The 14 year average oil content for beans from Brazil was 20.13 compared to the U.S. average of 19.17%. Quality of Brazilian beans also exceeds that of the U.S. on the factors of splits and foreign material. U.S. quality exceeded that of Brazil on the factors of test weight, protein content, free fatty acid,and damaged kernels. However, these averages conceal considerable year-to-year variability and provide no information on the variability among vessels within any given year. These data do not provide conclusive evidence of quality. For example, no information is given with which to judge the reliability of sampling methods. It is not clear whether analysis was made on an "as-received" basis or on clean beans at zero moisture. Without data from individual samples it is not possible to conduct any statistical tests for the significance of the differences.

A recent study conducted by USDA and ASA provides a more controlled experiment. The results of analysis of samples collected during a one-year period from European ports were mixed on the relative value of U.S. and Brazilian soybeans. The abstract (Appendix B) concludes: "In general, soybeans from Latin American countries showed higher oil and lower protein content than U.S. soybeans. Argentine soybeans showed high levels of split beans. Soybeans received from Brazil were uniformly graded as Sample Grade due to the presence of 4.0% red dust in the samples."

The number of samples per vessel was small and the study does not report statistical reliability of the estimates. The problem of non-uniformity and segregation in the vessel was not addressed in either set of data. If segregation problems and variability during loading are less in the Brazil shipments than in U.S. shipments (quite likely given inbound quality controls) sampling at destination is especially important to obtain statistically sound comparisons.

These surveys indicate that Brazil soybeans contain less FM and moisture than U.S. beans. It would appear that oil content is higher in Brazil beans but it must be recognized that there is a wide range of oil and protein values in Brazil (as well as in the United States) depending on the region of the country and the crop year. Estimates of average oil content in Brazil ranged from 18.5 to 19.5 percent with the State of Rio Grande do Sul having 18.5 and oil levels increasing as one moves north.

The results of two weeks of interviews with Brazilian farmers, grain handlers and government agencies and personal observations throughout the market channel demonstrate that differences in practices and policies undoubtedly result in fewer quality problems related to foreign material and storage molds in Brazilian beans than in U. S. beans. A review of quality-related handling practices and incentives will provide a basis for evaluation.

Grades and Grading

The Ministry of Agriculture has the legal authority to establish grades under Decree-Law 200 Article 39 Item VIII (Feb. 25, 1967) and Decree NO. 69.502 Article one (Feb. 5, 1971). CONCEX, the industry/government trade association, provides a system of grades and standards for soybeans identified as Resolution No. 82. This resolution identifies four grades of soybeans, but these grades are not the basis for the export contract. The CONCEX export grades shown in Table 15, specify a maximum moisture content of 14 percent regardless of grade. Broken kernels range from 10 percent to 40 percent for grades 1 through 4. Damage goes from a maximum of 2 percent in grade 1, to a maximum of 8 percent in grade 4. Heat damage is identified as a separate factor only at the grade 4 level with a maximum of 5 percent within the damage category. Extraneous materials (foreign material) is 1 percent for grade 1, 1.5 percent for grade 2 increasing to 5 percent at grade 4. Split beans or damaged seed coat beans have a maximum limit of 15 percent for grade 1 only. It is not a grade factor in grades 2, 3 and 4. It was explained that grade 1 is primarily for seed beans, and damaged seed coat is not important for beans for processing but only for use as seed. In addition, green colored beans are limited to 1, 2, 5 and 10 percent respectively for grades 1 through 4.

CONCEX standards define each of the grade factors as follows: (see Appendix C)

> Foreign material and impurities are defined as all material passing through a 3 mm sieve (7.5/64 in.). All material other than soybeans remaining on top of the sieve, including all seed coats that have separated from the bean are also considered foreign material and impurities.

Table 15. Brazil Grades for Soybeans (Percent)

Grade	Moisture	Splits	Damage	Foreign Material and Impurities	Pericarp Damage
No. 1	14	10.0	2.0	1.0	15
No. 2	14	20.0	4.0	1.5	--
No. 3	14	30.0	6.0	3.0	--
No. 4	14	40.0	8.0% with 5% HT	5.0	--

[1] Includes seed coat broken loose from the kernel.

[2] Included only for No. 1 beans as a measure of quality for beans to be sold for seed.

Source: CONCEX Resolucao No. 82 (export grades) June 5, 1973,
Rio de Janerio, P. VI, Article XV.

Brokens/splits are defined as all splits and pieces of kernels hand picked from the sample remaining on the 3 mm sieve.

Damaged kernels are kernels and pieces of kernels that are not almost perfect in color and shape.

Nearly all soybeans are exported under the ANEC Contract No. 41, which is a combination of the four grades established by CONCEX (Appendix D-1). The quality specifications of ANEC are referred to as Brazilian Export Quality Soybeans. This contract specifies maximum moisture of 14 percent; foreign material 1 percent with discounts allowable up to 2; damaged beans maximum of 8 percent of which 5 percent maximum may be heat damaged. Broken beans have a maximum allowance of 30 percent. A blank is left on the contract for entering oil content, but it is not part of the automatic language of the contract.

It is interesting to note that ANEC quality specifications used in the export trade do not match those of any of the CONCEX grades. For example, allowable foreign material is the same as CONCEX No. 1 grade but broken beans is equivalent to the No. 3 limit, while damage uses the limit established by CONCEX for grade No. 4. Despite the fact that most Brazilian beans move into the domestic processing market (in 1986 only 8 percent of total usage was exported as raw beans), the quality factors that are used throughout the domestic market are those identified in the ANEC export contract. The limits on which country elevators based discounts for foreign material, damaged beans and broken beans were often those limits established in the ANEC contract, not those of the Ministry of Agriculture or CONCEX. The primary deviation from the contract was by processors and/or elevators that specified 13 percent moisture (instead of 14 percent) as the maximum, based on their experience with storability.

The domestic standards established by the Ministry of Agriculture for the domestic market, contain only one grade. This grade follows the ANEC Contract with the exception of the factor Esverdeados, (green colored beans) in which case it is equivalent to the CONCEX No. 4 limit.

Sampling and Inspection Procedures

Grading and inspection at port elevators are conducted entirely by private inspection agencies. There is no federal inspection agency with responsibility for grading or for inspection equipment. It was reported that there were 12 private inspection agencies operating in Parana, including SGS, Thionville, Intertek and PKB. The majority (some estimate as much as 95 per cent) of inspections are done by the SGS International Agency for Product Inspections. The private inspection agencies led by SGS influence soybean quality throughout the market channel. Their control of outbound beans and meal generates the opportunity and requirement for them to control inbound products under their contracts with buyers and sellers.

Most of the soybean exports from the port of Paranagua moved through a pool arrangement serving as a public elevator for storage and handling. Thus the majority of soybeans coming into the Paranagua port is inspected by SGS on the basis of the grade factors in the ANEC contract. This is rigorously enforced. We were informed repeatedly and emphatically that any trucks not meeting the contract specifications on moisture and foreign material would not be allowed to dump. This statement was reinforced by records from SGS identifying 15 trucks by name, number, and quality characteristics that exceeded allowable limits and resulted in SGS refusing to give permission to unload. (See Appendix D-2 for a sample.) These trucks were forced to return to a nearby firm that could bring the soybeans back into grade requirements through drying or cleaning. SGS has complete authority over inbound and outbound quality at the port.

Each state has an inspection department that inspects processed and raw products. CLASPAR is the name of this agency in the State of Parana. All products crossing state lines must be inspected by the originating state agency. They may also be called to inspect public warehoused grain. CLASPAR is apparently not highly regarded by the industry and its reliability and accuracy were frequently disparaged by the firms interviewed. The CLASPAR inspection is not used for transaction purposes but does inspect government warehoused grain under contract with CFP.

The purpose of the inspection requirement was never explained. Apparently grain moving across state lines was supposed to be accompanied by a weight and quality certificate. There are weight limits on the highways for trucks. For soybeans moving to the port of Paranagua, destination quality determined by SGS was the basis for payment. Origin inspection and analyses were often conducted by the shipper for his quality control information but payment was based on destination quality. This differs from the United States where some contracts specify origin weights and grades, while others require destination weights and grades. Soybeans moving to destinations other than Paranagua did sometimes move on origin grades, depending on the firms involved and on contract specifications -- not unlike U.S. processors and country elevators.

The restrictions on inbound quality at the port which are carried throughout the market channel result in the majority of the crop meeting those conditions or better when moving in the market channel at any point past the first handler. The storage is primarily at the local elevator and the beans are conditioned for safe storage at that point. Little deterioration in quality and few losses occur during the months that follow.

The question of blending at country elevators has been an important issue in discussions of U.S. quality. While some elevators in Brazil do engage in blending, it is on a very limited scale. One large cooperative with flat storage indicated that one-half of the storage was filled with 14 percent beans, the other with 12 percent beans to permit blending. The same firm cleaned the beans before and after the drier and screenings were disposed of or sold back to local feeders. Given the large size and small number of storage facilities and separate bins both at the country and at the export house, blending is extremely difficult. However, with the standards and discounts in existence there is little incentive for blending or to create the physical facilities necessary for blending. The system of pooling inbound soybeans at the port elevator without identification of owner eliminates the opportunity for the individual exporter to blend to the contract maximum. Blending (i.e. pulling from several bins simultaneously) is controlled by the operations manager of the public elevator under direct supervision and control of SGS. Any soybeans delivered will lose their identity within the pool and the quality loaded at export is dependent upon the quality of beans available to the public elevator operator. Since nearly all beans in storage are equal to or better than export quality, opportunity for blending is extremely limited. Export contracts were largely based on factors equivalent to a one-grade system.

Inspection procedures in the country varied widely in the care and accuracy of the person doing the sampling and analysis. Frequent instances were found of non-representative sampling methods, carelessness in handling the sample, failure to properly subdivide the sample and a lack of clear definition of individual grade factors in their training program. Similar conditions can be found at country elevators in the United States.

Qualifications and Training of Inspectors

Training of grain inspectors is provided by CONCEX or the state inspection agency (CLASPAR), but the school is not mandatory. SGS works with government and universities to sponsor schools that offer certificates of training. Generally one employee from each elevator attended the school and on-the-job-training (OJT) was provided by him to other employees. A license is issued to persons who attend the school. We encountered one firm in which the inspector attended an annual refresher course.

Most inspectors did not appear to be well trained and therefore were extremely rigid on factor analysis, especially on interpretive factors such as damaged kernels. The vagueness of definition encouraged greater severity in the grading. For example, while the damage factor was vaguely defined in the standards, in practice, most inspectors were taking any non-perfect kernel and calling it damaged. The over severity in evaluating damage provided the inspector assurance that his grade would not be overturned or questioned at the next point in the market channel. The inspector tended to call any defect "damaged" for fear his grade would be marked as too lenient if regraded. This would seem to indicate a buyer bias since there seemed to be little expressed concern that the seller might call a reinspection and find the inspector had been too severe. This seems especially logical at the port where the public elevator pool was responsible for loading on contract grade but did not own the grain. SGS on the other hand could well be called to accountability at destination if damage had been underestimated at the export point.

Grading Equipment

Equipment was not standardized and apparently no regular checks were made of the equipment by a central authority in Brazil. The accuracy of sampling for inter-elevator movement is probably not a serious problem in that the low levels of FM and moisture, and lack of large scale blending makes the grain much more uniform within trucks or sublots. Consequently even carelessly taken samples were probably representative of the total lot, or at least sufficiently representative that it would not exceed the grade limit if reinspected. Even sampling methods by SGS at the port elevator were less sophisticated and systematic than are required in the United States. Samples of inbound trucks consisted of one or two probes taken in one corner of the truck accompanied by observation during dumping at the dump pit. Samples were being taken at the port on outbound soybeans by grabbing handfuls off the belt or by running a pan through a falling grain stream. These would not be considered representative samples by most statistical standards, but appeared to be adequate to meet the needs and preferences of the foreign buyer.

Foreign buyers have the option on the ANEC contract of requesting their own inspector to be present. However, the sampling methods were similar for all inspection agencies. The contract specifies that weights and grades are final as per seller's inspection agency.

Quality Control Through Genetics

New soybean varieties in Brazil must be approved by a commission appointed by the Minister of Agriculture. There are in fact two commissions: one for the southern part of Brazil and the second for the remainder of the country. The two Commissions test and approve varieties for release in each of these regions. The Commission is composed of: one representative of the Ministry of Agriculture, one representative of EMBRAPA (the National Soybean Research Institute), one representative of the State Research Organization, one representative of the State Extension Service, and one representative of the seed producers of the country. The procedure for testing includes two years of preliminary testing inside the organization which is developing the variety, followed by one year of intermediate testing at five locations in Brazil. The best lines from these five locations are sent for final testing at 10 locations over a two-year period. The Commission then meets to discuss the characteristics of each variety and decide which ones will be released. The decision is then published in the official newspaper. The Commission reviews criteria of yield, stability, disease resistance and agronomic characteristics. They will not release a variety unless it is equal to or better than the two varieties selected as the standard.

The two varieties for the standard are selected to represent four maturity groups. The best two varieties in each maturity group become the standards. One variety is selected for its highest yield, the second variety is selected because it is the most popular currently being planted in the region. Oil and protein content are identified but release of new varieties has not been restricted for lack of higher oil and protein. Brazil has the potential for controlling varieties to meet a gradually rising standard of quality with respect to oil and protein but in practice, this criterion is not being applied.

Evaluation of Quality in Brazil

Quality, past the farmer's deliveries, is quite uniform throughout the market channel. The ANEC contract is equivalent to a numerical grade with only one set of quality limits. Meeting these limits assures soybeans at 14 percent moisture, and less than one percent foreign material. Blending opportunities are, therefore, limited.

A few samples of soybeans and corn collected at random from country elevators indicate the generally high quality of Brazil grain with respect to cleanliness and moisture when graded on USDA standards. Moisture was below 14 percent with one exception, test weight was above 57.6 pounds per bushel and BCFM below 1.0 percent with one exception. Stress cracks were high on corn dried with heat and breakage susceptibility on the Wisconsin Breakage Tester varied from 6.3 percent (considered very good by U.S. standards) to 35.5 percent (still good for high temperature dried corn) (Table 15). These samples exhibited a high proportion of hard vitreous endosperm, indicating a harder corn with flint ancestry.

Export Quality in Brazil.

Each export vessel loaded in Brazil receives a certificate of quality issued by SGS or another private inspection agency. The ANEC contract was uniform throughout most of the industry although variations in the contract were possible. Oil content was frequently included in the export contract but was not automatic. A minimum of 18.5 percent was shown on those contracts we reviewed. Other quality factors were uniformly equal to or better than the contract limit on the contracts we reviewed. We were unable to obtain any summary of quality certifications for a historical review.

Incentives for Quality in the Brazilian System.

Premiums and discounts for quality differentials are controlled by the market. There are no government decreed price differentials and these varied among grain handlers and processing firms. Shrink factors for moisture were generally uniform but drying charges varied among firms. In many instances, processing plants were using shrink-plus-drying charges[1] that were less than actual weight reduction due to water removal. Those managers who recognized this explained that moisture was controlled by weather so their "premium" for wet grain did not function as an incentive but only as a better price to the farmer. Coops especially considered this a "non-problem" since any differences in profit would eventually be shifted to farmer-members.

[1] Shrink is the loss of weight due to removal of water. The quantity of wet grain was adjusted to that quantity remaining after drying to base moisture by subtracting "shrink." A drying charge was assessed to cover the cost of drying.

Table 16. Quality Characteristics of Brazil Corn Samples*, 1987

Sample ID	Grade	Moisture	Test Weight	BCFM	Damage	Stress Cracks	Brk. Sus.
B-1 Caraffo Dryer	1	13.4%	58.5%	0.8%	0.3%	50%	23.8%
B-2 Coamo Truck	1	12.9%	57.8%	0.7%	1.7%	88%	35.3%
B-3 Canorpa Dryer	2	12.7%	57.6%	0.4%	2.9%	50%	23.1%
B-4[1] Coopavel Truck	Sample	15.5%	n.a.	2.4%	28.0%	32%	6.3%

* Samples of corn provided by country elevators in Brazil from inbound trucks or from their grain dryer. Grade was determined by FGIS, USDA, Mobile, Alabama. Stress cracks and breakage susceptibility were determined in the University of Illinois Agricultural Engineering Grain Quality Laboratory.

1.1.1

The incentive for delivering soybeans at higher moisture levels was off-set by the necessity of safe storage and long distance transport. There was no concerted effort on the part of elevators to deliver soybeans at moisture levels above the 13 or 14 percent base.

Blending to achieve contract or grade limits was not a common practice in Brazil. Country elevators, and to some extent processors, described themselves as handlers or merchandisers for producers. Their responsibility was to condition producers' soybeans to meet the ANEC contract conditions. Unlike U.S. firms, the income was derived from payment for services rather than from blending to generate a high-priced shipment from lower priced receipts. Since nearly all soybeans moved on the ANEC contract factor limits the quality in the market was sufficiently uniform to provide little opportunity for blending. With a fixed base for moisture there was little incentive for blending on moisture. True foreign material from the farm was generally removed by the first handlers. In contrast, foreign material and broken beans from U. S. farms are generally stored with the beans and used for blending to grade limits. The small number of large volume storage bins in Brazil, and the small number of grade factors relative to the U.S., encourage storing and marketing all soybeans at a very uniform quality.

Strict control of inbound and outbound quality at the port by SGS eliminated the opportunity, if not the incentive, for blending inbound and outbound at the port elevator. Qualities were extremely uniform. Since identity of individual lots of grain was not maintained, there were no benefits from efforts to blend during vessel loading. SGS refusal to allow off-grade grain to be unloaded from inbound trucks provided a strong economic incentive for country shippers to deliver soybeans with grade factors below maximum to provide a margin of safety.

The emphasis upon quality was further illustrated by a processor with a published schedule of premiums for soybeans below 14 percent moisture and below 1 percent foreign material. His philosophy was that producers generating beans of greater value should be rewarded and this incentive would serve to encourage the better farmers to deliver higher quality beans to his plant.

COMPARISON OF UNITED STATES AND BRAZILIAN HARVESTING METHODS, GRADING PROCEDURES, AND QUALITY

There are many similarities between the two countries in production and marketing practices and grades and inspection procedures. There are also some important differences (Appendix E). Production and marketing of soybeans in Brazil and the United States use essentially the same technology. Brazil is producing on newly cleared land with highly erodible soils where nutrients leach rapidly in the near tropical climate. This requires better land management to maintain soil productivity over a long period. Marketing practices differ between the countries with U.S. farmers using on-farm storage and commercial storage to delay delivery into the market. In Brazil, nearly all soybeans are delivered into the market channel immediately following harvest.

Both countries use many of the same factors in determining grades or quality. These include foreign material, color, splits, and damage. However, Brazil's definition of these factors differ from those of the U.S. and there are even greater differences in the implementation of the definition by the inspectors -- especially on the factor of damage. Grading and inspection procedures exhibit some important differences from those in the United States (Appendix F).

SUBJECTIVE IMPRESSIONS OF QUALITY INFLUENCES IN BRAZIL

Intensive interviews and observation of the marketing process for a period of two weeks in Brazil provide some insights into the factors that influence quality. Not all of these insights can be quantified and may be subject to different interpretations by different people observing the same set of circumstances. However, we feel that these impressions should be shared; while emphasizing that they are in fact, impressions not factual data.

(1) Historical, economic and political conditions in Brazil have resulted in production and marketing systems in which almost all soybeans are delivered directly from the farm at harvest to the first handler. There is very little on-farm storage and conditioning and what little is done is limited to fairly large quasi-commercial operations. Therefore, the conditioning and cleaning of soybeans after they leave the farmer's combine is done almost entirely in commercial facilities with the accompanying technology and management skills in the market place.

(2) The economic incentives for delivering clean dry soybeans are the market determined discounts on the three grade factors (damage, splits and brokens, and foreign material) and refusal of SGS to accept less than the ANEC contract standard on inbound shipments received at the port.

(3) Numerical grades are few in number and simple in factor construction reducing the opportunity and the incentives for multiple blending on multiple factors and making less complex the process of meeting the No. 1 requirement.

(4) SGS control of the entire process of grades, grading and inspection in the port provides a high degree of uniformity and a fairly rigorous application of these grades at all points in the market channel. The interpretation of damage is strict and inspection agencies rigorously enforce quality standards. All soybeans in and out of the port, move under ANEC quality specifications.

(5) The cumulative effect of items 1 through 4 is to generate a clean, storable, low moisture grain at the first point in the market channel with subsequent storage and handling made easier as a result of this level of quality and cleanliness.

Grain marketing firms recognize the economic relationships between prices, discounts, and quality. They also recognize that delivering minimum quality allowed by the grades can be a source of income. Blending and upgrading do take place when that opportunity (physical and economic) is available. However, such activities are the exception as the result of the relationships described in 1 through 4.

GLOSSARY OF TERMS

BRAZIL

CONCEX (Conselho Nacional do Comercio Exterior)

CONCEX is an association of private traders and government agencies acting as an advisory board to the government on export related issues and regulations. They establish the export grain quality standards and assist in training grain inspectors.

CACEX (Carteira de Comercio Exterior of the Banco do Brazil S.A.)

CACEX is the foreign trade office of the Bank of Brazil. It supervises sales contracts and registrations, issues export licenses and establishes taxes and prices. Cacex may, upon request of interested parties, change the percentges of the established tolerances to the numerical grades.

CLASPAR

CLASPAR is the State Inspection Department for the State of Parana in Brazil. Each state has a department that inspects processed and raw products. All products crossing state lines must be inspected by the inspection agency of the originating state. They also inspect products purchased by the Government and may be called upon to settle quality disputes between shippers and receivers.

Private Surveyors (SGS, Thionville, Intertech, PKB, etc.)

Private surveying companies provide export inspection at the various ports. There were said to be twelve such companies at the port of Paranagua. SGS handles between 60 to 90% of the export business at Paranagua; the estimates differed among respondents. These private companies follow the rules established by the Government and they have tremendous control of the overall export shipment which includes marine surveyor of the vessel, weighing, sampling and inspecting the grain. They also have authority to stop loading when grain does not meet the Brazilian export quality.

Impurities

Impurities in Brazil grades refer to non-grain materials. It is similar to United States term foreign material except for the effort made to separate broken grain from the category. Since sieves were still part of the determination of impurities a complete distinction between grain and non-grain is impossible.

Delayed Price

In the United States, delayed price is a marketing technique where a farmer sells and delivers title to grain but reserves the right to select a later date on which to establish price. It usually

APPENDIX A

Table A-1. Production and Utilization of Soybean Meal in Brazil, 1965-1987 (in 1,000 mt)

Year	Crush	Extrac Rate	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
65	282	60.3%	170	2	0	172	105	0	0	64	169	3
66	395	61.5%	243	3	0	246	185	0	0	56	241	5
67	423	65.0%	275	5	0	280	125	0	0	149	274	6
68	471	70.3%	331	6	0	337	235	0	0	95	330	7
69	612	67.5%	413	7	0	420	310	0	0	102	412	8
70	932	74.1%	691	8	0	699	580	0	0	105	685	14
71	1700	70.0%	1190	14	0	1204	990	0	0	190	1180	24
72	2132	74.0%	1578	24	0	1602	1506	0	0	64	1570	32
73	2714	75.0%	2036	32	0	2068	1373	0	0	653	2026	42
74	4302	77.6%	3338	41	0	3379	2396	0	0	915	3311	68
75	5516	77.6%	4280	67	0	4347	3450	0	0	810	4260	87
76	6374	77.6%	4946	86	0	5032	4078	0	0	847	4925	107
77	8661	76.4%	6617	106	0	6723	5329	0	0	1255	6584	139
78	8682	77.0%	6839	138	0	6977	5368	0	0	1461	6829	148
79	9094	77.4%	7039	151	0	7190	5038	0	0	1971	7009	181
80	13009	76.6%	9965	182	0	10147	6936	0	0	2595	9531	616
81	13796	76.9%	10609	619	0	11228	8562	0	0	2271	10833	395
82	12728	77.6%	9877	393	0	10270	7822	0	0	1956	9778	492
83	12873	77.4%	9964	494	0	10458	7994	0	0	2169	10163	295
84	12517	77.6%	9713	291	0	10004	7690	0	0	1952	9642	362
85	13774	77.5%	10675	363	0	11038	9626	0	0	2100	10726	312
86	11900	77.8%	9258	305	0	9563	6800	0	0	2500	9300	263
87	13400	77.6%	10398	260	0	10658	7700	0	0	2700	10400	258

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

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APPENDIX A

Table A-2. Production and Utilization of Soybean Meal in the United States, 1964-1986 (in 1,000 mt)

Year	Crush	Extrac Rate	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
64	12875	79.5%	10236	110	0	10346	1847	0	0	8405	10252	94
65	14761	79.3%	11705	94	0	11799	2360	0	0	9326	11686	113
66	15413	79.4%	12238	113	0	12351	2410	0	0	9815	12225	126
67	15579	79.5%	12385	126	0	12511	2630	0	0	9755	12385	126
68	16743	79.0%	13227	126	0	13353	2762	0	0	10455	13217	136
69	20223	78.9%	15956	136	0	16092	3661	0	0	12321	15982	110
70	20718	79.0%	16367	110	0	16477	4136	0	0	12217	16353	124
71	19548	79.0%	15443	124	0	15567	3452	0	0	11950	15402	165
72	19351	78.3%	15152	165	0	15317	4304	0	0	10862	15166	151
73	22683	78.7%	17852	151	0	18003	5033	0	0	12521	17554	449
74	19163	79.1%	15158	449	0	15607	3900	0	0	11387	15287	320
75	23881	78.8%	18818	320	0	19139	4667	0	0	14164	18831	307
76	21045	79.7%	16773	307	0	17080	4136	0	0	12751	16887	193
77	25751	78.8%	20292	193	0	20485	5516	0	0	14767	20283	202
78	27821	79.4%	22090	202	0	22291	5997	0	0	16075	22072	219
79	30728	80.0%	24582	219	0	24802	7196	0	0	17430	24626	176
80	27606	79.9%	22057	176	0	22233	6154	0	0	15958	22112	121
81	28037	79.7%	22345	121	0	22467	6266	0	0	16071	22337	130
82	30427	79.6%	24220	130	0	24349	6449	0	0	17515	23964	385
83	26181	78.9%	20657	385	0	21042	4862	0	0	15983	20845	197
84	28331	78.5%	22240	197	0	22437	4460	0	0	17672	22132	305
85	28740	78.8%	22647	305	0	22952	5450	0	0	17344	22794	158
86	29393	78.7%	23132	158	0	23290	5352	0	0	17690	23042	248

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table A3. Production and Utilization of Soybean Oil in Brazil, 1965-1987
(in 1,000 mt)

Year	Crush	Extrac Yield	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
65	282	16.0%	45	2	9	56	0	0	52	0	52	4
66	395	15.7%	62	4	11	77	0	0	72	0	72	5
67	423	15.8%	67	5	15	87	0	0	82	0	82	5
68	471	16.1%	76	5	9	90	0	0	84	0	84	6
69	612	16.2%	99	6	3	108	0	0	100	0	100	8
70	932	17.8%	166	8	5	179	3	0	162	0	165	14
71	1700	18.0%	306	14	3	323	7	0	291	0	298	25
72	2132	18.0%	384	25	1	410	38	0	339	0	377	33
73	2714	19.5%	529	33	0	562	82	0	435	0	517	45
74	4302	18.5%	796	45	0	841	16	0	675	0	691	150
75	5516	18.5%	1020	150	0	1170	320	0	702	0	1022	148
76	6374	18.5%	1179	148	0	1327	430	0	800	0	1230	97
77	8661	18.3%	1585	97	0	1682	560	0	1025	0	1585	97
78	8882	18.3%	1625	97	0	1723	522	0	1110	0	1632	91
79	9094	18.4%	1673	91	123	1887	459	0	1309	0	1768	119
80	13009	18.9%	2459	119	3	2581	809	0	1516	0	2325	256
81	13796	18.7%	2580	256	0	2836	1212	0	1490	0	2702	134
82	12728	18.8%	2393	134	22	2548	873	0	1505	0	2378	170
83	12873	18.7%	2407	170	43	2621	947	0	1575	0	2522	99
84	12517	18.8%	2353	99	144	2596	920	0	1580	0	2500	96
85	13774	18.8%	2590	96	107	2792	935	0	1590	0	2525	267
86	11900	18.7%	2225	267	130	2623	380	0	1950	0	2330	293
87	13400	18.7%	2506	293	50	2848	550	0	2000	0	2550	298

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

APPENDIX A

Table A-4. Production and Utilization of Soybean Oil in the United States, 1964-1986 (in 1,000 mt)

Year	Crush	Extrac Yield	Prod	Beg Stx	Ttl Imp	Ttl Supply	Ttl Exp	Indus Use	Food Use	Feed/ Waste	Ttl Use	End Stx
64	12975	18.1%	2330	262	0	2592	608	118	1652	83	2461	131
65	14761	17.8%	2627	135	0	2762	419	119	1913	105	2556	206
66	15413	17.9%	2759	210	0	2969	488	118	1984	106	2696	273
67	15579	17.6%	2742	270	0	3012	437	113	2081	130	2761	251
68	16743	17.7%	2964	245	0	3209	395	113	2391	120	3019	190
69	20223	17.7%	3579	188	0	3767	644	103	2657	123	3527	240
70	20718	18.1%	3750	246	0	3996	790	93	2622	139	3644	352
71	19548	18.3%	3577	351	0	3928	634	82	2726	133	3575	353
72	19351	17.6%	3406	356	0	3762	484	85	2825	130	3524	238
73	22683	18.0%	4083	234	0	4317	651	103	3061	139	3954	363
74	19163	17.5%	3354	360	0	3714	466	84	2753	148	3451	263
75	23881	18.3%	4370	254	0	4624	443	94	3359	159	4055	569
76	21045	18.5%	3893	567	0	4460	702	104	3151	151	4108	352
77	25751	18.1%	4661	350	0	5011	933	109	3457	186	4685	326
78	27821	18.5%	5147	331	0	5478	1059	110	3761	195	5115	363
79	30728	17.9%	5500	352	0	5852	1220	92	3853	129	5294	558
80	27606	18.5%	5107	549	0	5656	740	92	3906	136	4874	782
81	28037	17.8%	4991	787	0	5778	942	92	4143	90	5267	511
82	30427	18.0%	5477	500	0	5977	918	93	4211	168	5390	587
83	26181	18.8%	4922	572	0	5494	827	105	4194	51	5177	317
84	28331	18.4%	5213	327	9	5549	753	0	4498	0	5251	298
85	28740	18.3%	5259	287	4	5550	570	0	4560	0	5130	420
86	29393	18.3%	5379	430	0	5909	544	0	4718	0	5262	547

Source: USDA-FAS. Foreign Agriculture Circular - Oilseeds and Products/World Oilseed Situation and Market Highlights, Various issues. Reference tables on the major producers and consumers of soybeans and soybean products.

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Table A-5. Production and Export of Wheat in the United States and Brazil, 1970-1986.

(in mmt/% of total)

	U.S.			Brazil	
Year	Prod.	Exp.	(%)	Prod.	Exp.
1970	36.8	19.8	(54)[1]	1.7	---
1971	44.0	16.3	(37)	2.0	---
1972	42.1	30.4	(72)	0.7	---
1973	46.5	32.9	(71)	1.9	---
1974	48.8	27.4	(56)	2.8	---
1975	57.9	31.9	(55)	1.6	---
1976	58.5	25.9	(44)	3.0	---
1977	55.6	30.6	(55)	2.1	---
1978	48.2	32.5	(67)	2.7	---
1979	58.1	37.4	(64)	2.9	---
1980	64.6	41.2	(64)	2.7	---
1981	75.7	48.2	(64)	2.2	---
1982	75.4	41.1	(55)	1.8	---
1983	65.8	38.9	(59)	2.1	---
1984	70.7	38.8	(55)	1.9	---
1985	66.0	24.9	(38)	4.3	---
1986	56.7	26.5	(47)	5.3	---

1) Numbers in parenthesis denote the percentage of production used for exports.

SOURCES: Calculated from Tables A-6 and A-7.

APPENDIX A

Table A-6. Supply and Demand for Wheat in Brazil, 1960-1986 (in 1,000 mt)[1]

Mktg Yr	Year	Local Crop Year	Beg Stx 1000 Mt	Area Hrv 1000 Ha	Yield Q./Ha	Prod'n 1000 Mt	Total Supply 1000 Mt	Total Imports 1000 Mt	Total Exports 1000 Mt	Dom Feed 1000 Mt	Dom Food 1000 Mt	Total Usage 1000 Mt
60	1961	(Jan-Dec)	200	1141	6.2	707	907	1995	0	0	2598	2598
61	1962	(Jan-Dec)	200	1022	5.3	542	742	2421	0	0	2966	2966
62	1963	(Jan-Dec)	200	743	9.5	706	906	2186	0	0	2892	2992
63	1964	(Jan-Dec)	200	793	4.9	389	589	2622	0	0	2864	2864
64	1965	(Jan-Dec)	350	734	8.8	646	996	1901	0	0	2851	2851
65	1966	(Jan-Dec)	343	767	7.6	583	926	2467	0	0	2925	2925
66	1967	(Jan-Dec)	470	717	8.6	617	1087	2433	0	0	2996	2996
67	1968	(Jan-Dec)	522	831	7.6	632	1154	2417	0	0	2887	2887
68	1969	(Jan-Dec)	681	970	8.8	854	1535	2237	3	0	3090	3090
69	1970	(Jan-Dec)	681	1407	9.8	1379	2060	1930	0	0	3419	3419
70	1971	(Jan-Dec)	566	1895	9.2	1743	2309	1710	0	0	3689	3689
71	1972	(Jan-Dec)	322	2261	9.0	2035	2357	1797	0	0	3973	3973
72	1972-73	(Oct-Sep)	180	1500	4.6	690	870	3011	0	0	3764	3764
73	1973-74	(Oct-Sep)	121	1820	10.6	1929	2050	2510	0	0	4228	4228
74	1974-75	(Oct-Sep)	340	2306	12.2	2813	3153	1946	0	0	4651	4651
75	1975-76	(Oct-Sep)	449	3111	5.0	1556	2005	3752	0	0	5365	5365
76	1976-77	(Oct-Sep)	391	3624	8.3	3008	3399	2729	0	0	5607	5607
77	1977-78	(Oct-Sep)	513	2800	7.4	2072	2585	3621	0	0	5955	5955
78	1978-79	(Oct-Sep)	245	2812	9.6	2700	2945	3931	0	107	6493	6600
79	1979-80	(Oct-Sep)	78	3832	7.5	2874	2952	4780	0	0	7200	7200
80	1980-81	(Oct-Sep)	637	3962	6.7	2664	3301	3910	0	0	7500	7500
81	1981-82	(Oct-Sep)	623	1922	11.5	2210	2833	4382	0	0	6300	6300
82	1982-83	(Oct-Sep)	922	2828	6.5	1839	2760	4000	0	200	6100	6300
83	1983-84	(Oct-Sep)	471	1900	11.1	2109	2580	4196	0	0	6400	6400
84	1984-85	(Oct-Sep)	367	1750	10.9	1908	2275	4690	0	0	6300	6300
85	1985-86	(Oct-Sep)	657	2800	15.4	4312	4969	2000	0	0	6800	6800
86	1986-87	(Oct-Sep)	157	3800	13.9	5282	5439	3000	0	0	8000	8000

[1] Harvested acreage in 1,000 hectares; yields in quintals/hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

APPENDIX A

Table A-7. Supply and Demand for Wheat in the United States, 1960-1986 (in 1,000 mt)[1]

Mktg Yr	Year	Local Crop Year	Beg Stx 1000 Mt	Area Hrv 1000 Ha	Yield Q./Ha	Prod'n 1000 Mt	Total Supply 1000 Mt	Total Imports 1000 Mt	Total Exports 1000 Mt	Dom Feed 1000 Mt	Dom Food 1000 Mt	Total Usage 1000 Mt
60	60-61	(Jul-Jun)	35747	20995	17.6	36951	72698	215	17954	1155	15311	16466
61	61-62	(Jul-Jun)	38411	20871	16.1	33602	72013	150	19672	1268	15180	16448
62	62-63	(Jul-Jun)	38980	17681	16.8	29704	68684	140	17305	616	15388	16004
63	63-64	(Jul-Jun)	32529	18416	16.9	31123	63652	111	23104	214	16001	16215
64	64-65	(Jul-Jun)	24532	20139	17.3	34840	59372	37	19347	2485	15423	17908
65	65-66	(Jul-Jun)	22242	20057	17.9	35902	58144	24	23367	4389	15750	20139
66	66-67	(Jul-Jun)	14563	20078	17.7	35538	50101	40	19980	2727	15860	18587
67	67-68	(Jul-Jun)	11551	23615	17.4	41090	52641	20	20197	1757	15990	17747
68	68-69	(Jul-Jun)	14657	22163	19.1	42331	56988	25	14693	4496	15632	20128
69	69-70	(Jul-Jun)	22226	19080	20.6	39305	61531	81	16478	5819	15191	21010
70	70-71	(Jun-May)	26780	17630	20.9	36847	63627	27	19849	5307	16075	21382
71	71-72	(Jun-May)	22371	19293	22.8	43988	66359	27	16311	7076	16239	23315
72	72-73	(Jun-May)	26807	19135	22.0	42097	68904	27	30392	5634	16564	22198
73	73-74	(Jun-May)	16302	21813	21.3	46462	62764	82	32906	3729	16925	20654
74	74-75	(Jun-May)	9226	26548	18.4	48848	58074	82	27416	2068	17000	19068
75	75-76	(Jun-May)	11839	28126	20.6	57940	69779	54	31924	1034	18697	19731
76	76-77	(Jun-May)	18126	28692	20.4	58532	76658	82	25855	2041	18508	20549
77	77-78	(Jun-May)	30291	26993	20.6	55606	85897	54	30590	5253	18125	23378
78	78-79	(Jun-May)	32061	22865	21.1	48245	80306	27	32500	4327	18449	22776
79	79-80	(Jun-May)	25148	25275	23.0	58133	83281	54	37422	2341	18970	21311
80	80-81	(Jun-May)	24549	28727	22.5	64636	89185	82	41204	1388	19741	21129
81	81-82	(Jun-May)	26916	32635	23.2	75713	102629	82	48199	3619	19433	23052
82	82-83	(Jun-May)	31542	31540	23.9	75381	106923	190	41068	5307	19375	24682
83	83-84	(Jun-May)	41232	24844	26.5	65837	107069	112	38890	10206	20042	30248
84	84-85	(Jun-May)	38063	27085	26.1	70692	108755	256	38758	11022	20378	31400
85	85-86	(Jun-May)	38779	26197	25.2	66016	104795	408	24902	7457	20983	28440
86	86-87	(Jun-May)	51846	24560	23.1	56734	108580	272	26535	8845	21229	30074

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[1] Harvested acreage in 1,000 hectares; yields in quintals/hectare.

Source: USDA-FAS. Foreign Agriculture Circular - Grains/World Grain Situation and Outlook. Various issues. Reference tables for Wheat, Corn, and Total Coarse grains.

APPENDIX B

PROGRAM ABSTRACT

QUALITY EVALUATION OF SOYBEANS RECEIVED IN EUROPE

T.L. Mounts and J.M. Snyder, Northern Regional Research Center, ARS/USDA, Peoria, Illinois; R.T. Hinsch and A.J. Bongers, European Marketing Research Center, ARS/USDA, Rotterdam, the Netherlands; A.R. Class, Board of Appeals and Review, FCIS/USDA, Grandview Missouri.

Soybean shipments arriving in Western Europe during a one year period have been sampled at four ports of entry: Rotterdam, the Netherlands; Gent, Belgium; Hamburg, Germany; and Lisbon, Portugal. Shipments originated from the US, Brazil, Argentina, Bolivia, and Paraguay. A minimum of five 2,000g samples were taken per vessel or hold for evaluation of quality. Samples were split in half, packaged, and shipped to ARS, Peoria, Illinois, for analysis of protein, oil, free fatty acid, fatty acid composition, totox value, color, and phosphotides; or to FGIS, Grandview, Missouri, for grading. In general, soybeans from Latin American countries showed higher oil and lower protein content than US soybeans. Argentine soybeans showed high levels of split beans. Soybeans received from Brazil were uniformly graded as Sample Grade due to the presence of 4.0% red dust in the samples. With the exception of the totox value, there was little variation in the results of analyses of extracted crude oils regardless of origin. The totox value is a measure of the oxidative status of the oil. Oils from US soybeans had totox values of 0.2-0.7 meq/kg while Argentine and Brazilian soybeans yielded oils with values of 1.5-4.5 meq/kg. Oxidative deterioration of crude oils is attributed to enzyme activity when the bean is split or the deposition of iron into oils due to residual dust remaining after beans are cleaned and dehulled.

APPENDIX C-1

Procedure for analyzing soybeans by SGS at the export market in Brazil.

Foreign material and impurities	Shake 250 grams over a 3 mm sieve. All material passing through the sieve is considered foreign material and impurities. All material other than soybeans remaining on top of the sieve including all seed coats that have separated from the bean are also considered foreign material and impurities.
Brokens/splits	All splits and pieces of kernels hand picked from the sample remaining on the 3 mm sieve.
Damaged kernels	Kernels and pieces of kernels that are not almost perfect in color and shape are taken as damaged kernels. Note: Brazilian inspections are much more rigid on interpretive factors such as damage than the U.S. inspectors.

APPENDIX C-2

DESCRIPTION OF MAJOR GRADE FACTORS DETERMINING THE GRADE LEVELS FOR QUALITY IN BRAZIL

SOYBEANS

(Act. No. 82, June 5th, 1983)

BROKEN KERNELS

1. Definition (Item XI)

Are the chipped, parted or fragmented beans which did not pass through the 3.165 mm (8/64") round-hole sieve.

2. Method of Determination (Item XI)

Shall be based upon the portion sample free from foreign matter and/or impurities as determined by the sieving procedures.

3. Sample Size (Item VIII)

A 250 gram portion of the sample obtained through the sample divider shall serve in the determination of the quality levels for broken kernels.

4. Sieve Size

The sieve shall have the following characteristics:

a) Aluminum sieve 0.8 mm (0.032 inch) thick.
b) Number of round-holes: 4 cm2 (3,716 per square foot).
c) Round-holes 3.165 mm (0.125 inch) in diameter.

FOREIGN MATTER AND/OR IMPURITIES

1. Definition (Item XI)

Are the grains or seeds of other vegetable species which after sieving remain on top of the 3.165 mm (8/64") round-hole sieve; also considered as such are fragmented, sapless, wrinkled, badly grained soybean grains and all foreign bodies and/or impurities that pass through the sieve shall be handpicked and joined with the other perfect grains of the sample.

2. Sample Size (Item VIII)

A 250 gram portion of the sample obtained through the sample divider shall serve in the determination of the quality levels for foreign matter and/or impurities.

DAMAGED KERNELS

1. Definition (Item XI)

Are the kernels or fragmented kernels of soybean damaged by weather, excessive humidity and high temperature; burnt kernels which have lost their characteristic color by the action of heat or fermentation; sapless ones or badly grained; those damaged by parasite or materially damaged by several causes; or those damaged by infestation of insects.

2. Method of Determination (Item XI)

Shall be based upon the portion sample free from foreign matter and/or impurities as determined by the sieving procedures.

3. Sample Size (Item VIII)

A 250 gram portion of the sample obtained through the sample divider shall serve in the determination of the quality levels for damaged kernels.

APPENDIX D-1

ASSOCIACAO NACIONAL DOS EXPORTADORES DE CEREAIS
Av. Senador Queirós, 611 - 3.° andar - São Paulo (SP) - Brasil
Telex N.° (011) 24838 ANEC BR

ANEC

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1974

BRAZILIAN SOYABEANS

F. O. B. CONTRACT FOR PARCELS

7th Amendment
Effective November 1st, 1986

SELLER: ....

BUYER ....

1. QUANTITY: .... (..) metric tons of 1,000 kilograms each, exact quantity. Shipment per one or more vessel/s.

2. QUALITY/CONDITION: Brazilian soyabeans, crop .... Oil content: ....

....

.... Moisture maximum 14%. Foreign matter basis 1% maximum 2% with non-reciprocal allowance of 1% for each 1%, fractions in proportion. Damaged beans maximum 8% of which maximum 5% heat damaged. Broken beans maximum 30%. Free from poisonous seeds/husks but tolerance maximum 0.005% castorseed and/or castorseed husks. To be final at time and place of shipment per certificate/s issued by customary control entity, cost being for Seller's account. Further quality condition in accordance with Brazilian Legislation ruling at time and place of shipment. Buyer has the option, at his expense, and for his own guidance, to request for joint sampling and sealing, advising the Seller in due time the name of the control entity he is appointing. For all effects and purposes results of the Seller's control entity will be final.

3. PACKING: In bulk.

4. DELIVERY: Between .... both dates included.

5. CONTRACT PRICE:

5.1 US$ .... (..) per metric ton of 1,000 kilograms each, basis Bulk Carrier, delivered free on board, stowed and trimmed, or

5.2 Basis Chicago Board of Trade price for the month of .... 19 .... at par/plus/less US$ .... (..) per bushel. The US$ per bushel value multiplied by 36.7454 is the US Dollar price per metric ton of 1,000 kilograms each, basis Bulk Carrier, delivered free on board, stowed and trimmed.

Criteria for Price Fixing:

A) At Seller's option, price will be fixed during the session of the Chicago Board of Trade. Seller to advise the Buyer, in writing, until latest 30 minutes before the opening, the required price and respective quantity, and the order will be considered automatically executed if the respective month trades at least US$ 0.005 per bushel over the given order. This, however, not to include the opening and closing ranges where, as per the rules of the Chicago Board of Trade, brokers are not responsible for execution. If Chicago futures do not trade during that session at US$ 0.005 per bushel over the limit stipulated by Seller, no price fixing has taken place for that day, unless Buyer advises within 2 hours after the close that part or total of the pricing order given has been priced, and in that case Seller to accept quantity given by Buyer. Seller has the right to change pricing instructions during the session, provided Buyer has not already executed the original instructions by the time the new order reaches the floor.

For orders given or changed during the session of the Chicago Board of Trade, however, Buyer not to be responsible for execution.
Seller to fix the price latest 5 business days prior shipment, but not later than 2 business days prior the first notice day of the month serving as basis for the pricing of this contract.

For any balance unpriced within above deadline, the "settlement price" of the close on the said second business day shall automatically be accepted to price this contract.

B) Futures in exchange, with Buyer/Seller to give up a number of future contracts closest to the contracted quantity, to Seller/Buyer latest 5 business days prior shipment or latest 2 business days prior to first notice day of Chicago Board of Trade basis month whichever earlier.
The give up party to confirm number of futures and values soonest.

Such give up to be within the daily trading range. If on the fifth day prior to commencement of loading or on the second day prior to first notice day of Chicago Board of Trade basis month Buyer/Seller has failed to give up all or part of the required future contracts, Seller/Buyer shall have the right to buy/sell the outstanding amount of future contracts at the market on the first business day following above deadline.

6. PORT/S OF SHIPMENT: ....
Safe performed basis one safe berth in each port at Seller's option.

7. NOMINATION OF VESSEL: Buyer to give nomination of vessel to Seller, together with despatch/demurrage rates, flag, age and ownership, in writing, in time for Seller to receive with minimum 15 clear days notice of earliest readiness of tonnage at first or sole port of loading. Seller has the right to reject nomination of a vessel whenever any of the above information is not mentioned. Such rejection to be effected without delay. Laytime not to start counting before the 16th day, at 08:00 hours, after nomination date even if loading commences earlier.
With minimum of 10 days prior estimated arrival of vessel at first or sole loading port, Buyer to give pertinent documentary instructions and vessel's destination.

Buyer to keep Seller informed of any delay in expected date of vessel's readiness. Nomination of vessel is irrevocable unless Buyer can prove "force majeure" or Seller agrees to substitution or all the following conditions are fulfilled:

A) The substituting vessel must be on or about the same position. The word about to mean: five days earlier up to five days later than the last reported ETA.

B) If earlier than last reported ETA of original nomination, substitution must be given latest four business days prior the new vessel ETA.

C) Above conditions to be considered without prejudice to the original preadvice of the first nomination.

D) The substituting vessel must go to the same destination as the originally nominated vessel.

8. WEIGHT: To be final at time and place of shipment per certificate/s issued by customary control entity, cost being for Seller's account. Buyer has the option, at his expense, and for his own guidance, to request for joint weight control, advising the Seller in due time the name of the control entity he is appointing. For all effects and purposes results of the Seller's control entity will be final.

9. GENERAL LOADING CONDITIONS: Tankers excluded.

Cargo to be loaded:

9.1 The lesser of: as fast as vessel can receive, or as fast as berth equipment can load. No demurrage, no despatch, however if vessel gave notice of readiness in time and if not sufficient goods available to start loading on the 16th day after vessel's nomination or when free berth becomes available, whichever later or if continuous loading of the vessel has to be interrupted due to lack of cargo, Seller to pay demurrage the value of which must be declared in nomination, or,

9.2 Into the main holds only at the following average daily rates which are to apply on the total cargo:

A) Self-trimming Bulk Carrier .... 2,000 metric tons
B) Non self-trimming Bulk Carrier .... 1,500 metric tons
C) Non Bulk Carrier .... 1,200 metric tons

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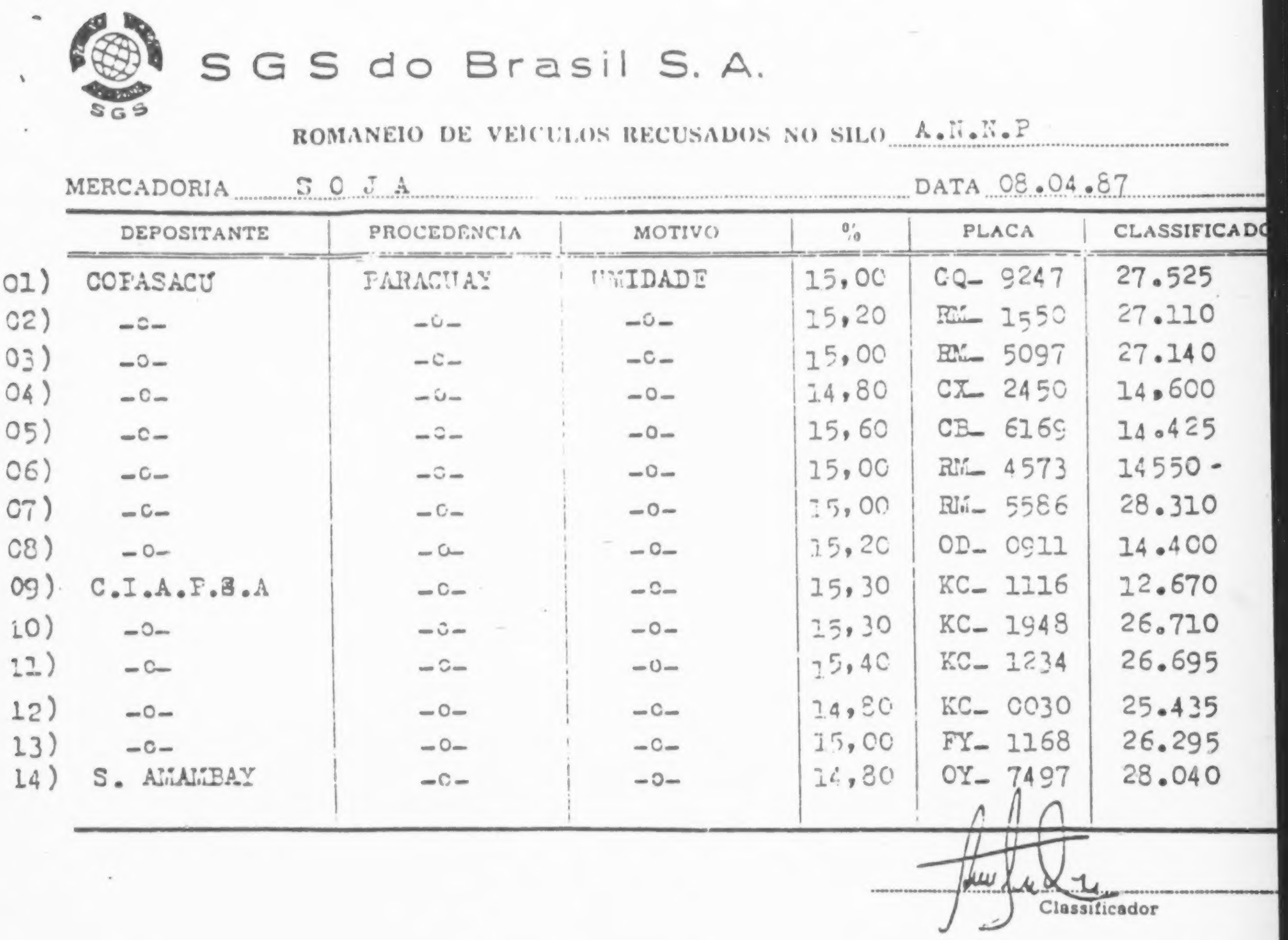
Appendix D-2. An example of trucks rejected at Paranagua on the basis of excess moisture (14 trucks) and excess impurities (1 truck) on April 8, 1987.



SGS do Brasil S. A.

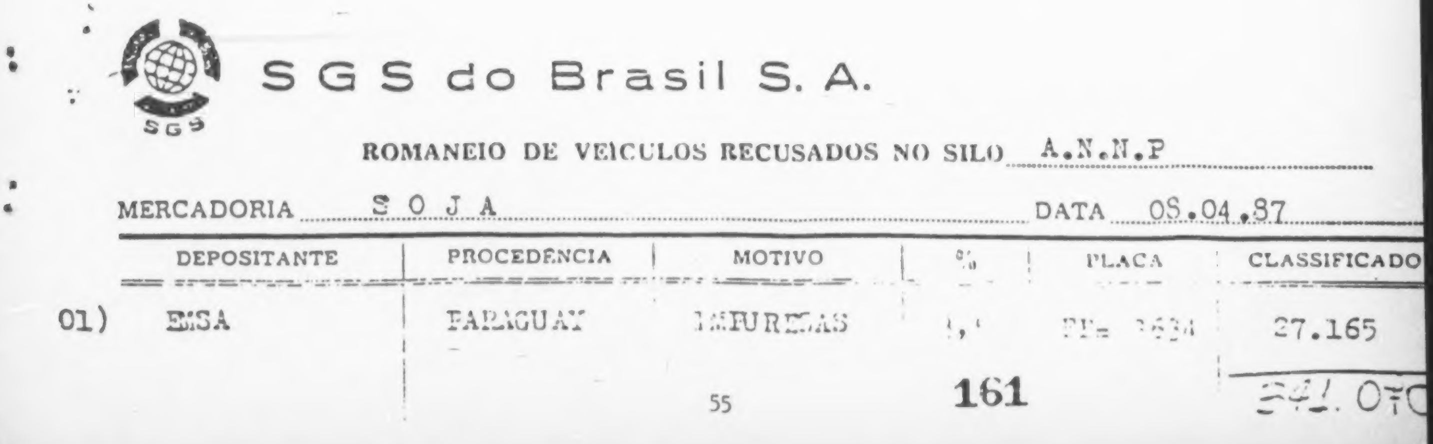
SGS

ROMANEIO DE VEICULOS RECUSADOS NO SILO A.N.N.P

MERCADORIA S O J A DATA 08.04.87

	DEPOSITANTE	PROCEDENCIA	MOTIVO	%	PLACA	CLASSIFICADO
01)	COPASACU	PARAGUAY	UMIDADE	15,00	CQ- 9247	27.525
02)	-o-	-o-	-o-	15,20	RM- 1550	27.110
03)	-o-	-o-	-o-	15,00	RM- 5097	27.140
04)	-o-	-o-	-o-	14,80	CX- 2450	14,600
05)	-o-	-o-	-o-	15,60	CB- 6169	14.425
06)	-o-	-o-	-o-	15,00	RM- 4573	14550 -
07)	-o-	-o-	-o-	15,00	RM- 5586	28.310
08)	-o-	-o-	-o-	15,20	OD- 0911	14.400
09)	C.I.A.P.S.A	-o-	-o-	15,30	KC- 1116	12.670
10)	-o-	-o-	-o-	15,30	KC- 1948	26.710
11)	-o-	-o-	-o-	15,40	KC- 1234	26.695
12)	-o-	-o-	-o-	14,80	KC- 0030	25.435
13)	-o-	-o-	-o-	15,00	FY- 1168	26.295
14)	S. AMAMBAY	-o-	-o-	14,80	OY- 7497	28.040

Classificador



SGS do Brasil S. A.

SGS

ROMANEIO DE VEICULOS RECUSADOS NO SILO A.N.N.P

MERCADORIA S O J A DATA 08.04.87

	DEPOSITANTE	PROCEDENCIA	MOTIVO	%	PLACA	CLASSIFICADO
01)	EMSA	PARAGUAY	IMPUREZAS	[illegible]	[illegible]	27.165
						341.070

Appendix E. Comparison of Production and Marketing Technology in Brazil and the United States.

Farmer	United States	Brazil
	Production	
Soils and Topography	Major production areas are on stable soils. Low erosion. Fertility stabilized. Soybeans usually incorporated in a rotation with corn or other crops.	Expanding production on newly cleared soils. Long slopes and year-round erosion and leaching create more problems of maintaining fertility. Extensive terracing required. Continuous soybeans not unusual in Parana and Mato Grosso do Sul.
Cultural practices	Fertilizer, insecticide, and herbicide used as needed. Mechanized soil preparation, seeding and cultivation.	Fertilizer, insecticide, and herbicide used as needed. Mechanized soil preparation, seeding and cultivation.
Harvesting	Self propelled combine.	Self propelled combine.
Storage	On-farm storage available for about 50 percent of corn and soybeans.	Virtually no on storage.
	FIRST HANDLER	
Receiving	Truck dumps and hoists for virtually all farm wagons and trucks.	Truck dumps and hoists at larger facilities. Many vehicles unloaded by hand.
Drying	Few soybeans dried. Mostly gas fired.	Majority of soybeans dried. Wood and coal used for fuel.
Storage	Flat and upright storage. Upright predominantes.	Flat and upright storage. Flat predominates.
Handling	Use augers, conveyors, belts and vertical legs.	Use augers, conveyors, belts and vertical legs.

Transportation to ports and processors.	Trucks for short hauls. Rail and water for long distance movement.	Truck predominates for all distances. Water available only in southern district moving beans to Rio Grande do Sul.
Pricing	Most corn and beans sold cash at delivery but significant use of a variety of techniques such as delayed price, forward prices, futures markets. First handler relies on futures market to shift risk.	Majority of beans sold on a form of delayed price with partial payment at delivery. No farmer use of futures. Only occasional use of futures by country elevator.

PROCESSORS

Processing and Handling	Mechanical handling, dryers, solvent process for meal and oil. Receipts by truck and rail.	Mechanical handling, dryers, solvent process for meal and oil. Receipts by truck and rail.
Pricing	Hedging on futures markets a standard procedure. Most purchases from grain dealers.	Hedging seldom used. Futures usually limited to parent company. Forward contract on products. Purchases split between farmers and grain dealers with the majority from farmers during harvest.

EXPORT HOUSES

Handling	Vertical storage, high speed in and out, rail and barge receipts predominate. High speed outbound belts. Multiple bins and cleanears facilitate blending.	Vertical and flat storage. Truck inbound for majority of receipts. High speed outbound belts. Small number of bins. Cleaners seldom available providing limited opportunity for blending.

Pricing	All purchases and sales covered in the futures markets. Public and private tenders.	Limited use of future markets. Mostly operating futures from offices in other countries. Cover with back-to-back sales or 3rd country hedging by subsidiaries.
	SEED VARIETY CONTROL	
Genetic research	Private and public.	Private and public.
Seed distribution	Private, local, national, and international firms.	Cooperatives are major distributors. Some private firms involved.
Seed certification	State government.	State government
Variety control	None.	A committee with broad representation including EMBRAPA, directs research and approves varieties. Quality is a potential criterion but not currently effective.

APPENDIX F. COMPARISON OF GRAIN GRADING PRACTICES IN BRAZIL AND THE UNITED STATES

SAMPLER/INSPECTOR TRAINING AND QUALIFICATIONS

Activity	United States	Brazil
Interior Elevator Samplers	On-job-training by elevator personnel. Qualifications none.	On-job-training by elevator personnel Qualifications none.
Interior Elevator Inspectors	On-job-training by elevator personnel.	One elevator employee trained by Concex or state inspection agency. Others received on-job-training. License issued to one individual who attends training course. Others do not have license.
Export Elevator Official Samplers	On-job-training by official inspection personnel. Sampling conducted by FGIS employees or person licensed by FGIS.	On-job-training by inspection personnel. No license required for sampling.
Export Elevator Inspectors	FGIS employee or licensee	SGS requires training and license with 3 months of classes. Classes are organized and conducted by government and university personnel.

GRAIN HANDLING PRACTICES AT INTERIOR ELEVATORS

Receiving	Received and placed in bin according to quality. Conditioning seldom required.	All grain is conditioned for storage and placed in bins. Seldom segregated by grade factors.
Drying	High mosture grain is dried, especially if it is going to be stored. Moisture levels in storage and transit vary according to discounts, storage conditions, and future use. Different moisture levels may be blended prior to shipment.	ANEC contract requires to 14.0 percent. Processors and country elevators, typically specify 13 percent for safe storage.
Cleaning	Generally grain is not cleaned when it comes off the farm. It is placed in bins according to quality so that it can be blended with grains of different quality when loaded out.	All soybeans that exceed Brazilian export quality (foreign material 1.0%) are cleaned. Corn is cleaned to less than 1.0%.
Storage	Generally stored in silo type bins segregated by quality, which expedites blending at time of loading and shipping.	Flat storage facilities predominate. Bins are seldom segregated by quality since most grain is clean and dry. Size and number of bins are not conductive to sophisticated blending.

Grading and inspection	Quality established by elevator personnel. Variety of sampling technology. Quality factors based on grade factors and crop conditions.	Quality established by elevator personnel. Variety of sampling technology. Quality factors based on grade factors and crop conditions.
Screenings and FM	No incentives for farmers to clean soybeans below the market limit of percent. Elevators have an incentive to blend to the maximum limit on brokens and foreign material.	The enforcement of ANEC contract quality specification on FM in soybeans inbound to the port generates an incentive for farmers and elevators to clean soybeans before shipping.
Disposal of screenings	The feed market must compete for screenings with use in blending or commingling diverse qualities to meet No. 2 grade.	Generally sold to feed manufacturers for animal feed. No evidence that screenings were used for blending.

GRAIN HANDLING PRACTICES AT EXPORT ELEVATORS

Storage	Received and placed in bins according to grade factor. Grain is purchased according to numerical grades. Export quality based on variety of contracts.	Soybeans not meeting Brazilian export quality as per ANEC contract are rejected. Generally not separated by quality because of limited storage space.

Drying	Many export facilities have dryers but soybeans are seldom dried.	Since grain is dried by the first handler there is little need for driers at export elevators and they are seldom used.
Cleaning	Most export facilities have capacity for cleaning. Grain is often cleaned prior to exporting.	Since grain is cleaned by the first handler and since grain not meeting Brazilian export quality is rejected there is little need for cleaning. Little or no cleaning capacity.
Screening Disposal	Generally used to mix with grain at the time of loading to attain max. limits allowed for contracted grade. Excess sold to the feed industry.	Since grain received must meet Brazilian export quality, there is little need to clean grain. When it is cleaned, it is used for animal feed.

SAMPLING AND INSPECTION SYSTEM: INBOUND-COUNTRY ELEVATOR

Regulation	Inspection is permissive for grain purchases. Grain Standards Act has no requirement for official sampling and inspection of grain delivered by the farmers.	Regulations on grades do not control sampling and inspection at the country elevator.

Sampling and inspection	Elevator employees perform most sampling and most loads are analyzed for most factors in the grades.	Elevator employees perform most sampling and most loads are analyzed for most factors in the grades.
Review and appeal	No review inspections are performed on elevator inspection, but a sample may be submitted to official agency.	Sample may be sent to state agency (Claspar) for inspection, but seldom done. No review of elevator grading.
Sampling equipment	Sampling methods used by elevator personnel vary from the "coffee can" technique to end gate sample, to multiple probes with compartmentalized or open throat trier to diverter type samplers. Samples drawn by an official agency use a compartmentalized trier or diverter sampler.	Samples were taken by open throat probes in various patterns and by end gate sample during unloading.

SAMPLING AND INSPECTION SYSTEMS: INTERELEVATOR MOVEMENTS (Including Inbound to Export)

Regulation	Inspection is permissive, unless the soybeans are sold by U.S. grade.	Inspection is permissive. Generally all grain is inspected by the shipping and receiving elevators.

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Grade certification for shipment	Grain shipped between elevators may be of any grade including sample grade.	Grain shipped between elevators generally meets the minimum export standards. Grain not meeting these standards may be rejected by the receiving elevator.
Sampling equipment	Compartmentalized probe or diverter sampler	Open throat probe or from grain streams as truck is unloaded.

SAMPLING AND INSPECTION SYSTEMS: EXPORT

Regulation	Law requires inspection by official inspection personnel on all export grain except as provided in certain cases by waiver.	Law requires inspection by independent surveyors who follow the rules established by Concex.
Vessel Examination	Vessel must be examined prior to loading for condition such as clean, dry and free of insects. Not more than two insects injurious to stored grain allowed.	SGS inspects vessel prior to loading for condition such as clean, dry, and free of insects.

Export Grain Quality	Any quality of grain may be exported that is agreed to under contract. Most U.S. exports are either grade 2 or 3. Elevator targets the limits for each factor.	Grain must meet the Brazilian export quality, if not loading is stopped by surveyor. Use of public warehouse and pooled grain storage removes sellers' opportunity to blend to minimum acceptable contract quality.
Sampling Equipment	Diverter Sampler mandatory. Multiple samples mechanically drawn from the belt.	Sampled with small pans from belt as grain moves to vessel.
Insect Examination	Examines 1250 grams from each 5,000 bu. loaded. Insect tolerance established by HB II.	Random examination during loading. If insects are found, grain must be fumigated.
Sample size	Numerous cuts of the diverter sampler are composited into sublots. Sublots of 18 to 60 thousand bu. are sampled and analyzed continuously during loading.	Sublot samples of each 500 tons are analyzed, and a weighted average calculated for the entire ship. Size of sublot composites or ship composites are determined by customer contract.

Final grade basis	Weighted or mathematical average of all sublots is used to calculate values for the certificate.	Final grade is based on mathematical average or composite sample.
Quality control during loading.	Elevator personnel monitor continuously during loading, and adjust the blend. Official results are reported to elevator personnel on each sublot during loading or before release from shipping bins.	Quality control is maintained by private surveyors, who have power to stop the loading. Uniformity in the port elevator is controlled by inbound quality.
Tolerance on non-uniformity.	A statistically sound inspection plan (Cusum) is used which allows a specified tolerance beyond the contracted grade limits.	Variability is not closely monitored during loaading but uniformity of grain in storage minimizes the problem. No statistical plan. Grading results on sublots are not available during loading.
Inbound grain quality	Permissive inspection. Elevator will generally accept grain, so long as it meets the grade purchased. Any grade may be purchased.	Inspection required by surveying company. Grain not meeting export quality (a single grade is rejected. Surveying company personnel have total control in quality of grain unloaded.

Location of sample analysis.	FGIS laboratory is located at the elevator. Analysis is conducted during loading. Results available shortly after the last sub lot is loaded.	Samples are analyzed at independent surveyor's lab some distance from the elevator.
Inspection authority	FGIS, USDA	SGS and other private inspection agencies operating under the ANEC contract and permissive authority of CONCEX.
Certification	Quality and weight certificate is issued under the authorityof FGIS, USDA.	Quality and weight certificate is issued by the private surveyor company, e.g., SGS.

Background Paper No. 3

A Comparison of Quality Factors of the French and United States Grain Systems

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March 1989

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U.S. Congress

This background paper was prepared for the assessment "Enhancing the Quality of U.S. Grain for International Trade." The views expressed are those of the author(s) and not necessarily those of OTA.

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General Outline

I. Introduction

II. Overview of Wheat Production and Marketing

III. Price and Income Policies in the EC and France

IV. Wheat Marketing Industry - Overview

V. Quality Control in France
   A. B. Zortum

VI. Variety Development and Release

VII. Conclusions
   A. Summary
   B. Evaluation of Quality in France
   C. Comparisons with United States

I. Introduction

Traditionally the European Economic Community (EC) had been an importer of wheat, particularly stronger wheats which were used for purposes of blending. However, since the mid-1970s the EC has become an increasingly competitive net exporter of wheat and in recent years is a major competitor. The EC market share increased from 6 to 17 percent between the mid-1970s and 1987/88. In fact in the last 10 years the EC is the principal exporting region which has gained market share, each of the other exporting countries generally losing. The U.S. is the country which has lost the most market share.

There are many factors which have influenced these developments. While most recent attention focuses on the pricing policies of the EC and the value of the export restitution, there are a number of other phenomena of importance. These include productivity growth, generally improving end-use quality, trade policies, and favorable political relations with important growth regions/countries. In addition, the EC has been the largest exporter of wheat flour relative to all other exporting countries. The quality of wheat in the EC differs from that of the other traditional exporters. It is generally considered a lower protein, soft wheat which produces weak flour. However, the quality of wheat in the EC varies across the member countries. This is especially true with the increased production of wheat in the United Kingdom in recent years which has had noted problems associated with quality. However, in the case of France, the principal exporting country for the EC, the quality of wheat has been maintained in the past 10 years despite substantial increases in productivity.

The purpose of this study is to analyze the institutions, policies and trade practices in France that have an influence on the quality of wheat which is exported. In the second section background information is provided on wheat production and marketing in the EC and France. The relative importance of France in the EC wheat market is discussed. Supply and demand data are presented as well as yield comparisons and general data or quality. Exports and market shares to principal EC markets as well as selected data on flour trade are presented. Section III provides a description of price policies in the EC. Particular attention is given to the administration of the intervention price, the principal mechanism which influences prices and quality. Section IV describes the wheat marketing industry. Conditioning practices are described as well as market channels. Section V describes the mechanism for variety development and release. The main topic of Section VI is the control of quality in France. Grading, inspection, certification are discussed. The final section provides the conclusions. A summary, an evaluation of wheat quality in France, and comparisons to the U.S. are presented in this section.

II. Overview of Wheat Production and Marketing

Descriptive data are presented in this section on wheat production and marketing in the EC and France. First, the relative importance of France in EC wheat production is described. Subsequent sub-sections present selected data on supply/demand, productivity, exports, and flour trade. The final section presents historical data on wheat quality in France. Figures are contained at the end of this section and statistical tables corresponding to this section are in Appendix A.

A. France and the European Community

The European Community is a group of countries which joined together in 1957. Originally there were six member countries including Belgium, Federal Republic of Germany, France, Italy, Luxembourg, and the Netherlands. Since then, the UK, Ireland, and Denmark joined in 1973, Greece in 1981, and Spain Portugal joined in 1986. Thus, currently there are 12 countries in the EC.[1]

Production of wheat has increased in the EC from 36 million metric tons (MMT) in the 1960s to a peak of 82 MMT in 1984. Since the production has decreased to 70 MMT in 1986 (Table 2.1). France is by far the largest wheat producing country in the EC with about 35-40 percent of the production in recent years. The relative importance of France in EC wheat production has been fairly constant through time. However, there have been significant declines in the relative importance of wheat production in Italy, decreasing from about 23 percent in the 1960s to 12 percent in recent years. Also of importance is that wheat production in the UK increased from 9 percent of the EC, to nearly 20 percent in recent years. Most of the increased production in the UK occurred after 1973 which is when the UK joined the EC. The production shares in the other member countries are relatively minor, and generally stable (Figure 2.1). The area planted to wheat in France is about 35-37 percent of total wheat area in the EC (Table 2.2), but production in France is about 40-44 percent of that of the EC. This indicates the general tendency that average yields in France exceed most of the rest of the EC.

---

[1] Most data (at the time of this writing) is aggregated for the first 10 member countries. Thus the data are generally reported as EC10, representing the EC excluding Spain and Portugal.

Production of wheat in France is located generally in the area around Paris. Wheat production extends north of Paris, and across to the southwest. There is scattered production, but relatively minor, in the southern parts of France. The relative importance of the regions of production in France is shown in Table 2.3 for the 1986 and 1987 crops. The largest five regions produced 55 percent of the production in recent years.

B. Supply and Disappearance of Wheat

Data on the supply and disappearance of wheat in the EC is listed in Table 2.4 and shown in Figure 2.2. The EC has always been both an importer and exporter of wheat. Imports have been primarily for blending and improving the strength of the indigenous wheat. Generally prior to 1971 imports exceeded exports. However, since then exports have exceeded imports. Since 1977 exports have exceeded imports regularly and have increased at an escalating rate.

Domestic disappearance of wheat in the EC is quite high relative to total disappearance. In 1985/86, domestic disappearance was 77 percent of total disappearance in the EC, which is far greater than the other wheat exporting countries (Table 2.5). However, the percentage domestic utilization in the EC in recent years follows a general decline compared to the earlier years. The primary domestic use of wheat in the EC is for human consumption in the form of bread products (Table 2.6). However, compared to other exporting countries, domestic use of wheat for feeding purposes is relatively high in the EC. In the past 10 years the proportion of wheat used for feed has increased from 25 to 32 percent, and that used for human consumption has decreased from 69 to 60 percent. This indicates that feed use of wheat has increased in relative importance.

An important feature of the EC marketing system is that relatively little is stored between marketing years. This has important implications for quality control and maintenance. Generally a very small proportion of production is stored into succeeding marketing years. This is a result of the general Common Agricultural Policy, and is also likely related to the relatively high cost of storage in France due to climatic conditions. Typically only 15-20 percent of the wheat production is stored, but this has increased in recent years (Table 2.7). For comparison all of the other wheat exporting countries, with the exception of Argentina, store a substantially larger proportion of production. There has been a significant increase in the percent stored in the U.S. and decrease in that in Canada since the early 1970s.

The area planted to wheat in the EC is relatively constant and approximately equal to that in Canada (Tables 2.8, 2.9, and Figure 2.3). There are no major trends in area planted in either the EC or France. For comparisons, the area planted in the U.S. is nearly double that of the EC in recent years. However, there is much more variability in area planted in the U.S., and substantial decreases since 1980 (Figure 2.3).

Productivity

The predominant type of wheat produced in France is a winter soft wheat. In addition, small amounts of spring soft wheat and durum are produced (similar comparisons are not available for the EC). Though durum production has been relatively incidental, there have been substantial increases in recent years. Yields for winter soft are greater than spring soft, which exceed those of durum (Table 2.10).

Yield comparisons between major exporting countries are made in Tables 2.11 and 2.12 and Figure 2.4. Yields in France and the EC are substantially greater than the other exporting countries. In 1986, French wheat yields were 2.5, 2.4, 3.1, and 3.7 times as great as Canada, the U.S., Argentina, and Australia, respectively. However, yields in France have been decreasing since their peak in 1984, and to a lesser extent in the U.S., Argentina and Australia.

To evaluate productivity growth between countries, a semi-log model was estimated over the time series 1962-1986.[2] Results are shown in Table 2.13 along with the derived growth rate for each exporting country. This is strictly interpreted as the constant relative, or proportional, change in yields per year. Over the time series the fastest growth rate was that of France with an average of 1.3 percent yield growth per year. This compares to 0.73 percent for the U.S. and lesser values for the other exporters. Also of interest is the R^2 which is the percent of variability in yields explained by the trend. These values for Australia, Argentina, and Canada are relatively low indicating both very little growth and substantial variability in yields. Actual yields and those predicted from the growth model are shown in Figure 2.5.

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[2] The estimated model was $\log y = \gamma + \beta T$ where y = yield, and T = trend, $T = 1, 2, \ldots$

Exports

The U.S. has always been the largest exporter of wheat, followed by Canada, EC, and Australia, in approximate order or importance. Exports from the U.S. have been more variable than the other exporters, and decreased between 1981/82 and 1986/87. The EC has traditionally been a relatively minor exporter, but has had notable growth since the mid-1970s which has exceeded that of the other exporters (Table 2.14, 2.15, and Figure 2.6). The market share for the U.S. reached a peak of 49 percent in 1973/74 but decreased to 29 percent in 1985/86 (Table 2.16 and Figure 2.7). The market share of the EC has increased from 6 percent in the mid-1970s, to 17 percent in the recent years. Market shares of the other exporters have been relatively constant. Another comparison is the proportion of production which is exported (Table 2.17). The EC exports a relatively small proportion of their production, 24 percent in recent years. That of the other exporters is substantially greater, especially for Canada, Australia, and to a lesser extent, Argentina. Thus, compared to other exporting countries, exports from the EC are of relatively less importance.

Exports to the largest markets for the EC are shownin Tables 2.18-2.21 and Figures 2.8-2.10. The largest markets (in descending order) are the USSR, Egypt, Algeria, Poland, Morocco, and Syria. Other markets are of lesser importance, and are largely located in the mid-east and Africa. Besides the USSR, the principal markets for the EC are scattered throughout the mid-east and Africa which have had above average growth rates in imports (Wilson, Riepe, and Gallagher). Exports from the EC to the USSR were nil in the 1970s, but increased substantially after 1981/82. Following Canada, the EC is the second most important wheat exporter to the USSR.

Market share data to these countries are shown in Table 2.19 and 2.21 and Figures 2.8-2.10. The EC market share of the USSR market has increased from nil in the 1970s to 21 percent in recent years. The market share of the U.S. decreased from 63 percent to nearly 21 percent, nearly all of which was HRW. Algeria is a country in which the EC has increased, and the U.S. has decreased, market shares. The EC market share went from virtually nil in the early 1970s to over 50 percent in the 1980s. The U.S. share in this market declined continually. Poland is another country in which the EC has shown growth which was offset by losses for the U.S.

Wheat Flour Exports

The EC is the largest exporter of wheat flour with domineering positions in each of the principal markets. Compared to the other exporting countries, flour exports are of great importance to the EC. In the 1970s up to 60-70 percent of wheat exports from the EC was in the form of flour (Table 2.22). The EC has had an important tradition of exporting flour vis-a-vis the other countries. This has been facilitated by important commercial relationships and by the flour export subsidy program of the EC. In recent years the relative importance of flour exports from the EC has declined (i.e., relative to wheat) and comprises 22 percent of exports in recent years. Thus, the increase in EC exports noted earlier has been disproportionately larger for wheat, than flour. Also, the percent of exports in the form of flour is less for France compared to the EC, suggesting that other EC countries must export a larger proportion of flour compared to wheat. Flour is of less importance, declining and nearly inconsequential for the U.S. and other wheat exporting countries. Thus, the EC is domineering in the international wheat flour market compared to other exporters, and flour exports is of greater relative importance for the EC.

The principal wheat flour market is North Africa which is just less than one-half of the world (Table 2.23 and 2.24). This is followed by Sub-Sahara Africa. Both of these markets have had fairly rapid growth (Figure 2.11 and 2.12). Other markets are the mid-east, USSR, and Latin America, each of which are declining in volume. In general, market shares of the other exporters to the regions are quite sporadic (Table 2.24 and Figure 2.13). The EC has had 60-70 percent of the North African market, with the U.S. ranging from 11-54 percent in recent years. The U.S. share of the Sub-Sahara market, however, has been increasing since 1981, and that of the EC has been decreasing.

C. Wheat Quality in France

Data have been collected by Institute Technique des Cereales et de Fourrages (ITCF) on wheat quality, as well as for other crops. Data were obtained for crop years 1976 to 1986 and are presented here briefly as a general description, and to identify trends. French wheat is categorized into three, or sometimes four, principal types. The two most important are Standard and Superior milling wheat. There are up to 20 production regions delineated by the ITCF data. Crop quality data are collected by variety, each of which were previously assigned to one of the above categories. For purpose of this study the data were aggregated using a weighted average across producing regions, for each of the two categories. Weights which were used were the percent of planted area to each region during 1987--similar area figures were not available for earlier years.

The resulting weighted average crop quality data are shown in Table 2.25 and Figures 2.14 and 2.15. Several points are of interest. Though the protein level for standard wheat exceeds that of Superior wheat, the other direct measures of quality of protein (strength) are greater for Superior than

Standard wheat. This may confirm why the French sometimes are more reliant on alveograph and Zeleny tests for trading and policy. Another important observation is that in the past two years the alveograph measures were substantially greater than the long-term average. Correlations between the quality characteristics, and trend are shown in Table 2.26. Several correlations amongst the characteristics are of interest. There are positive and significant relationships between protein, Zeleny, and alveograph. Of particular interest is that in general there is no correlation with trend. With one exception, all of these are not significantly different from zero. This indicates that significant positive or negative trends are not apparent. This suggests that the increases in yield discussed above have occurred without sacrifices in crop quality. The one exception is that farinograph of the Superior wheat has a significant negative trend. Regressions between each quality factor and trend are shown in Table 2.27 and were used to plot the trends shown in Figures 2.14 and 2.15.

Wheat samples from the 1987 crop were obtained for purposes of making comparisons to U.S. wheat standards and end-use performance. Seven samples were obtained at various location in France and analyzed official using U.S. methods and procedures. The results are shown in Table 2.28. Four of the wheat samples graded U.S. No. 1, one graded U.S. No. 2, one graded U.S. 3, one graded U.S. No. 4. Average for eachof the U.S. factors and comparable French factors are also shown.

The seven wheat samples were also analyzed for end-use performance for soft wheat at the Soft Wheat Quality research lab at Wooster, Ohio. These results are shown in Appendix B. None of the soft wheat would be acceptable for U.S. soft wheat flours based on a number of tests. Generally, the French wheats are an intermediate quality, somewhere between U.S. soft and hard red winter wheats.

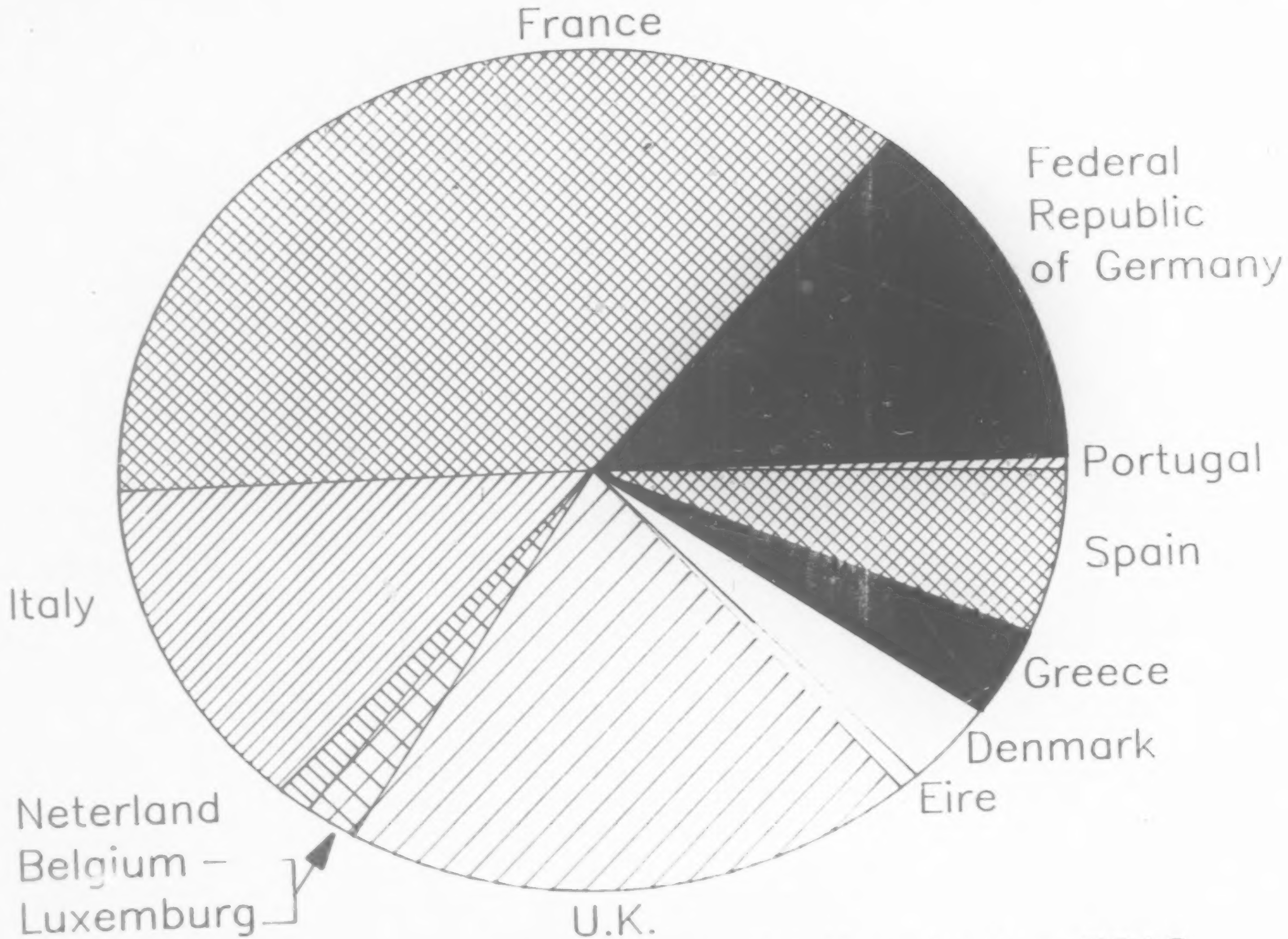

Figure 2.1 Shares of Wheat Production in the EC12 Countries for 1986

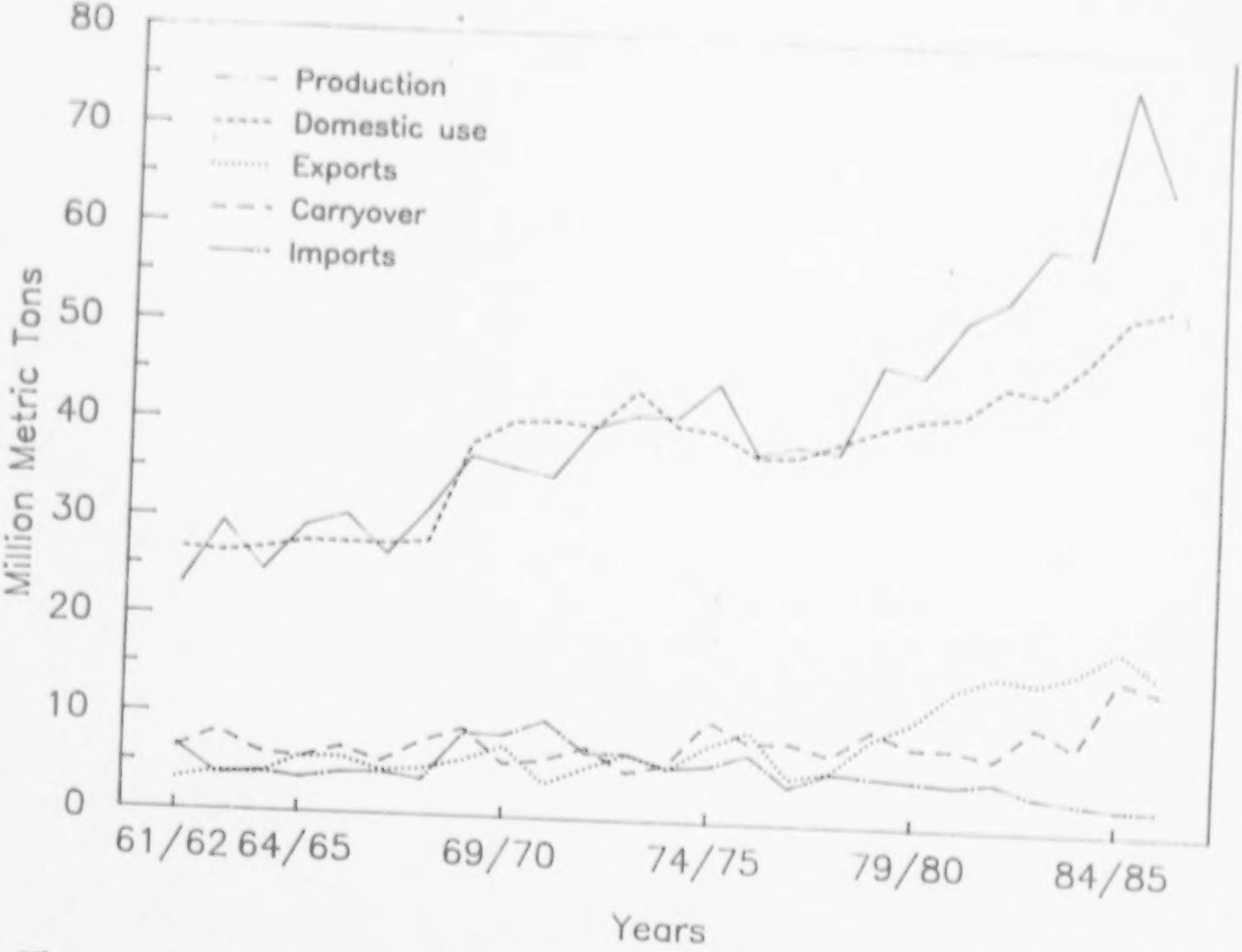

Figure 2.2 Wheat Supply and Disappearance for EC

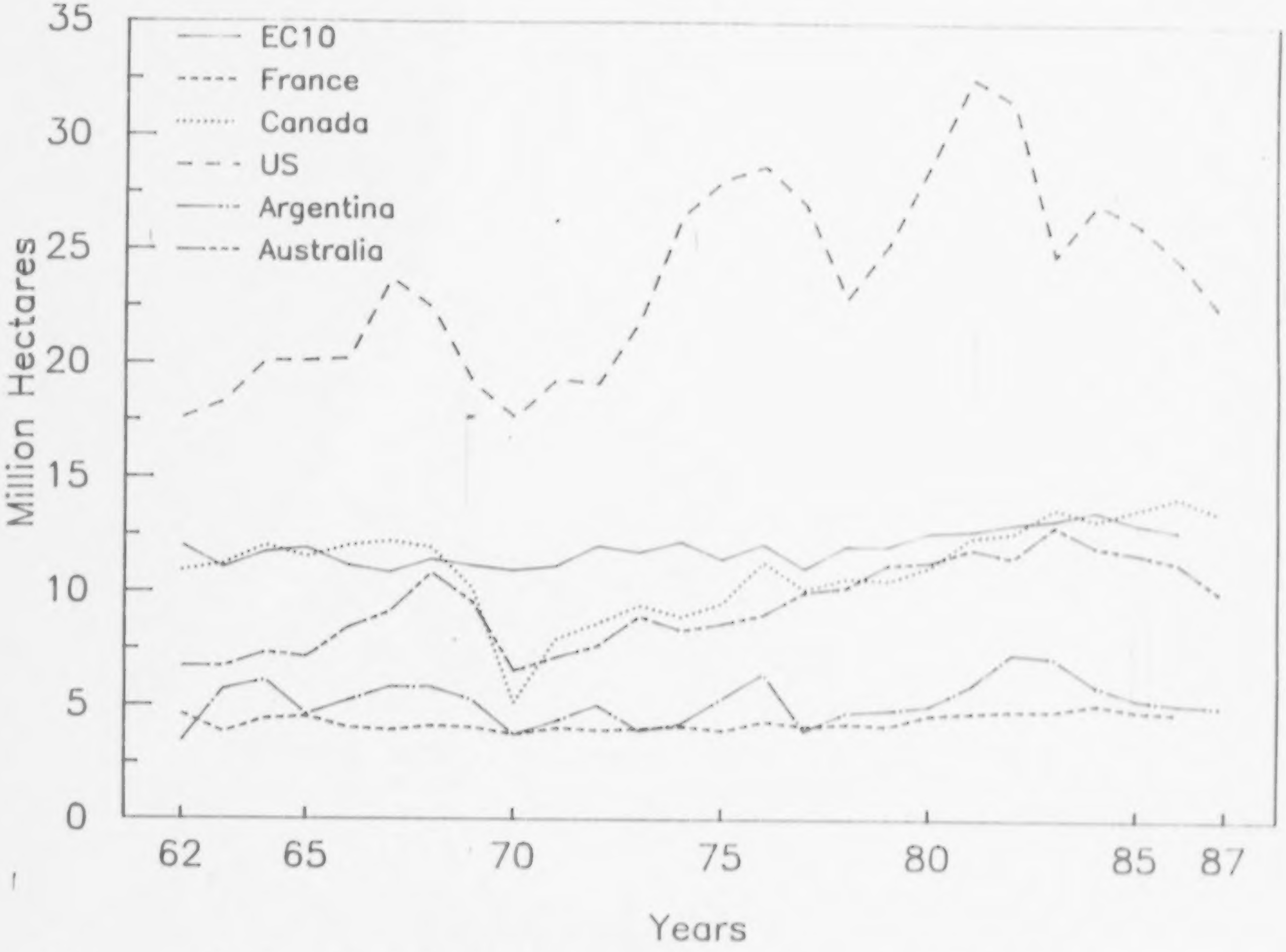

Figure 2.3 Planted Area by Major Exportors in Million Hectares

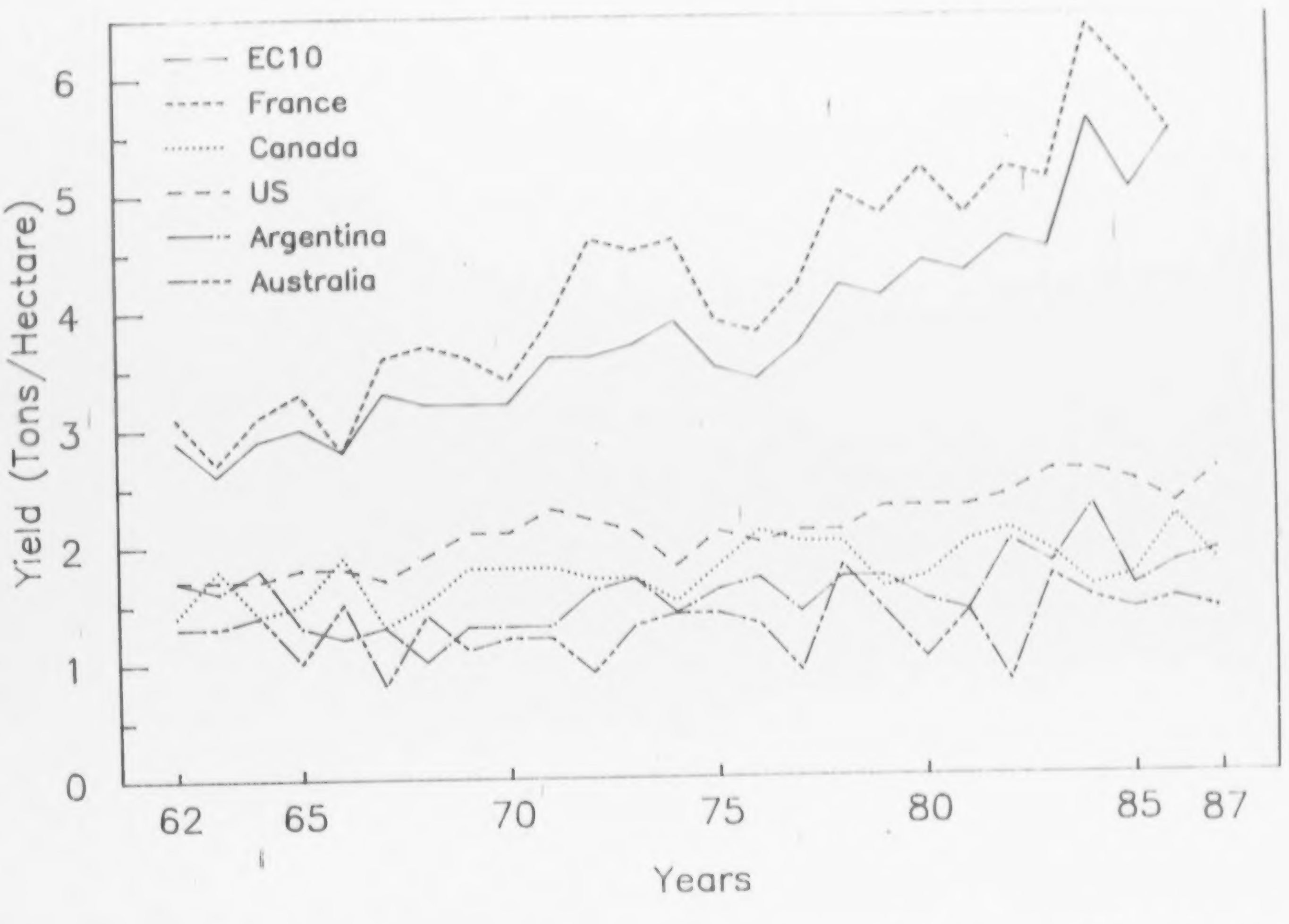

Figure 2.4 Yield by Major Exportors in Tons/Hectare

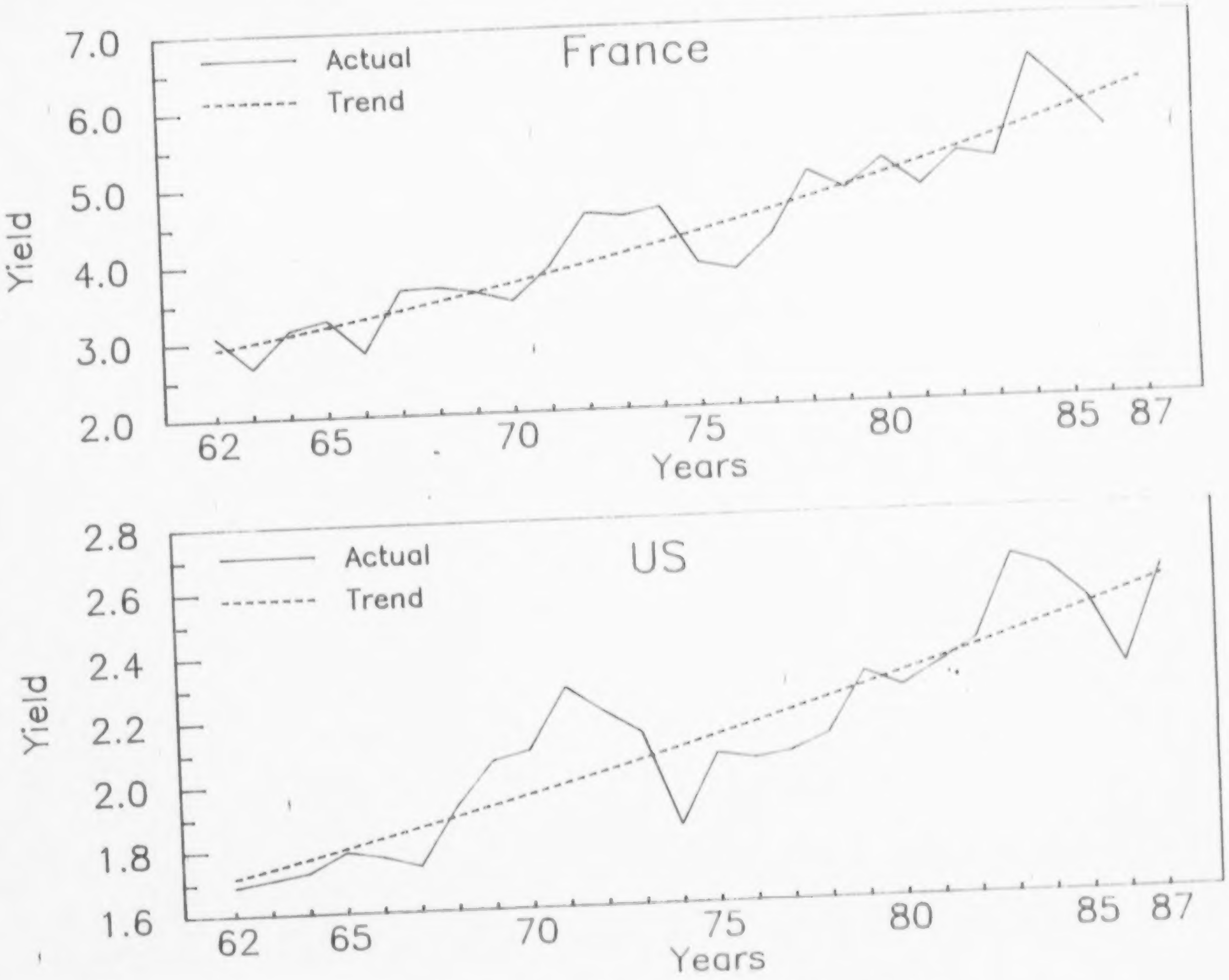

Figure 2.5 France and US Yield Trends

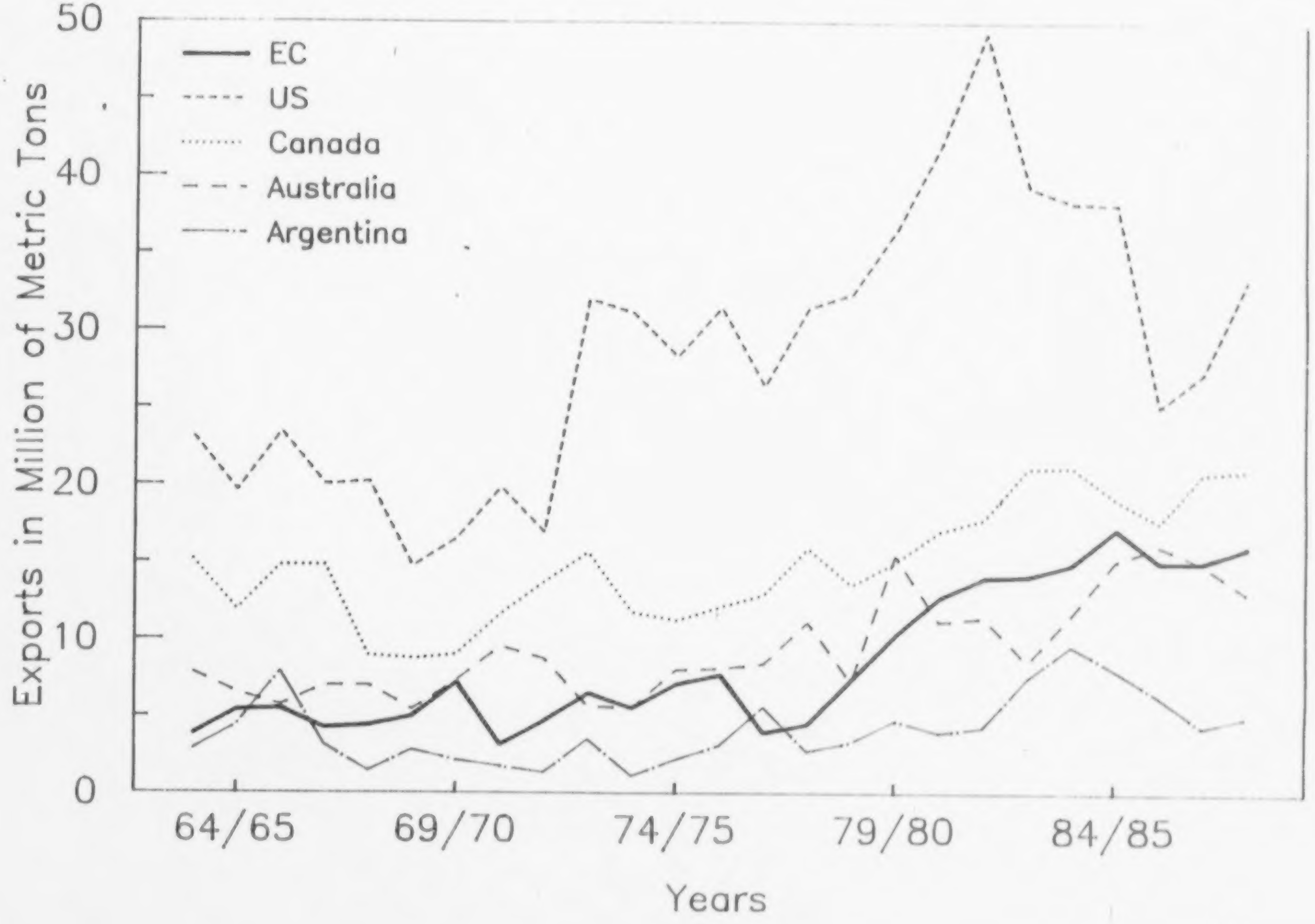

Figure 2.6 Exports by Major Exportors

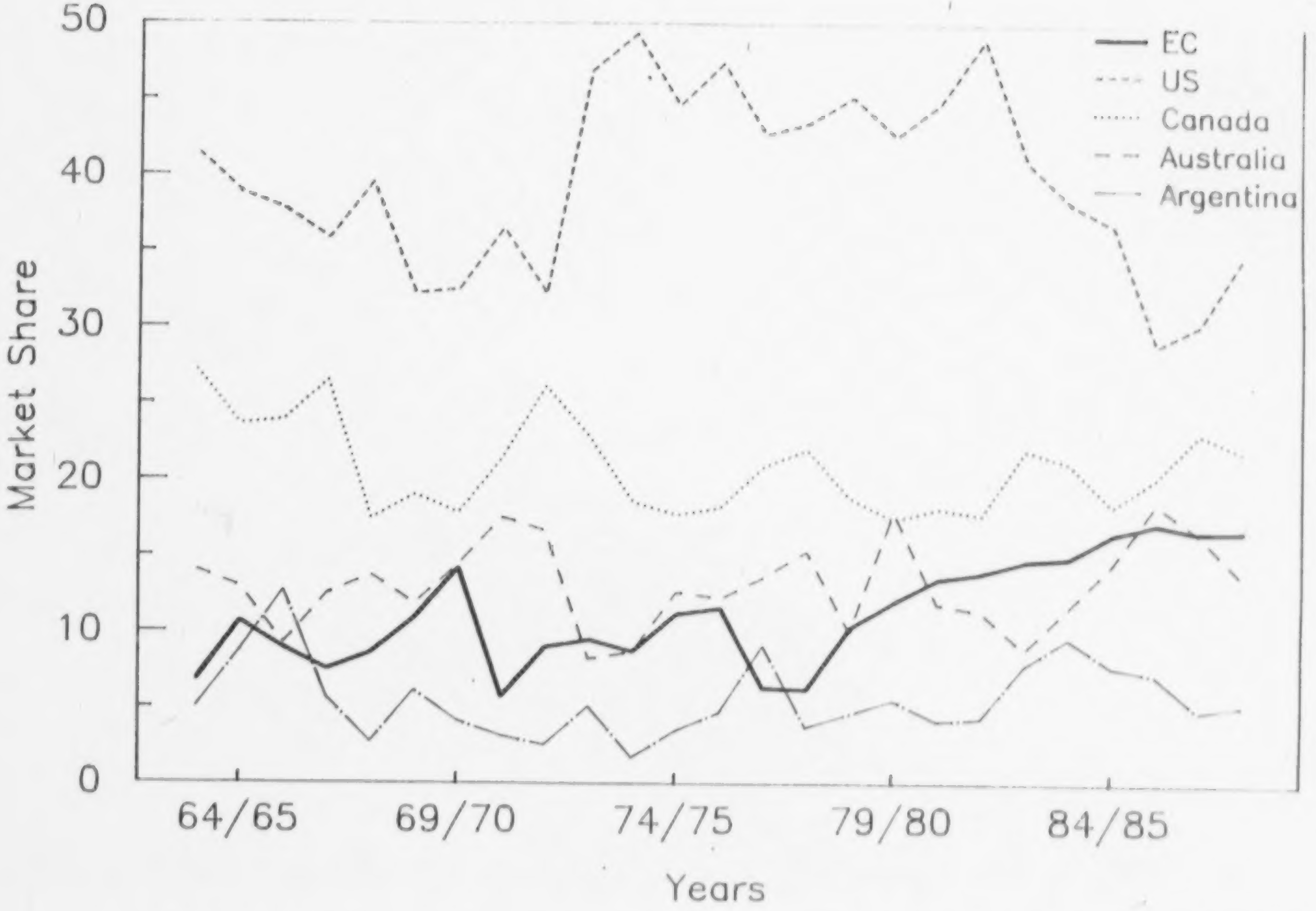

Figure 2.7 Market Share of Exports by Major Exportors

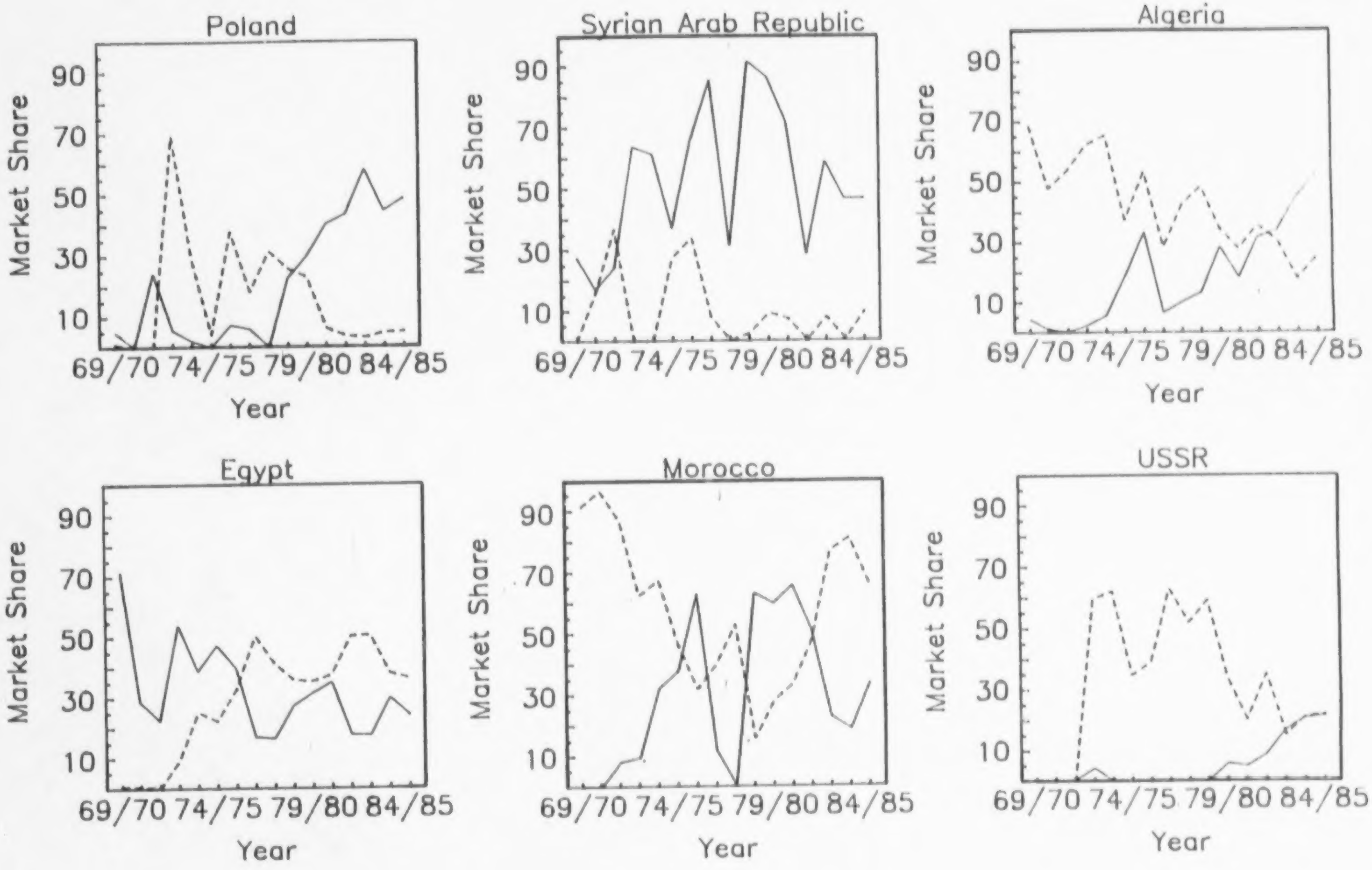

Figure 2.8 Market Share for EC (—) and US (---) to Selected Countries

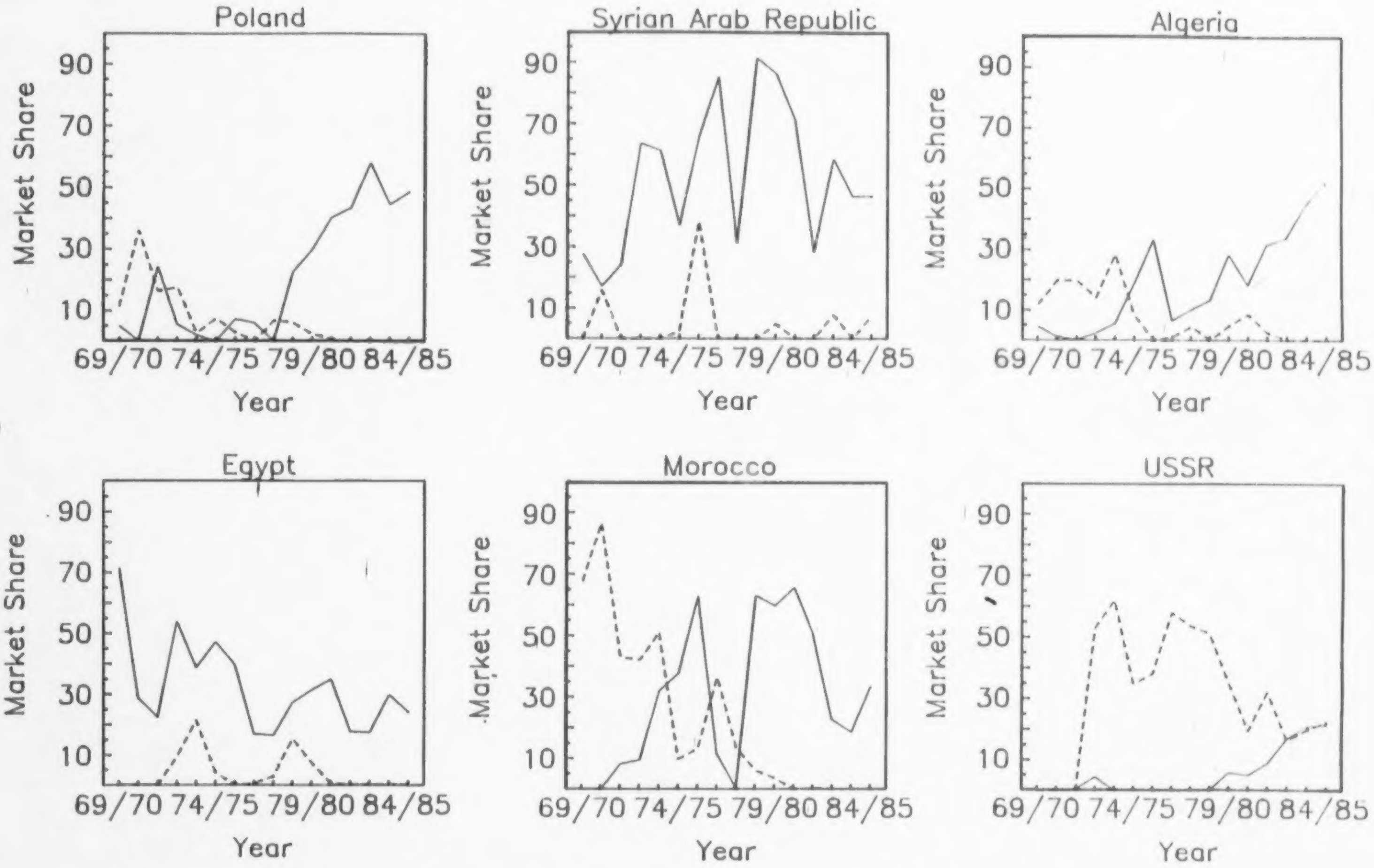

Figure 2.9 Market Share for EC (—) and US HRW(---) to Selected Countries

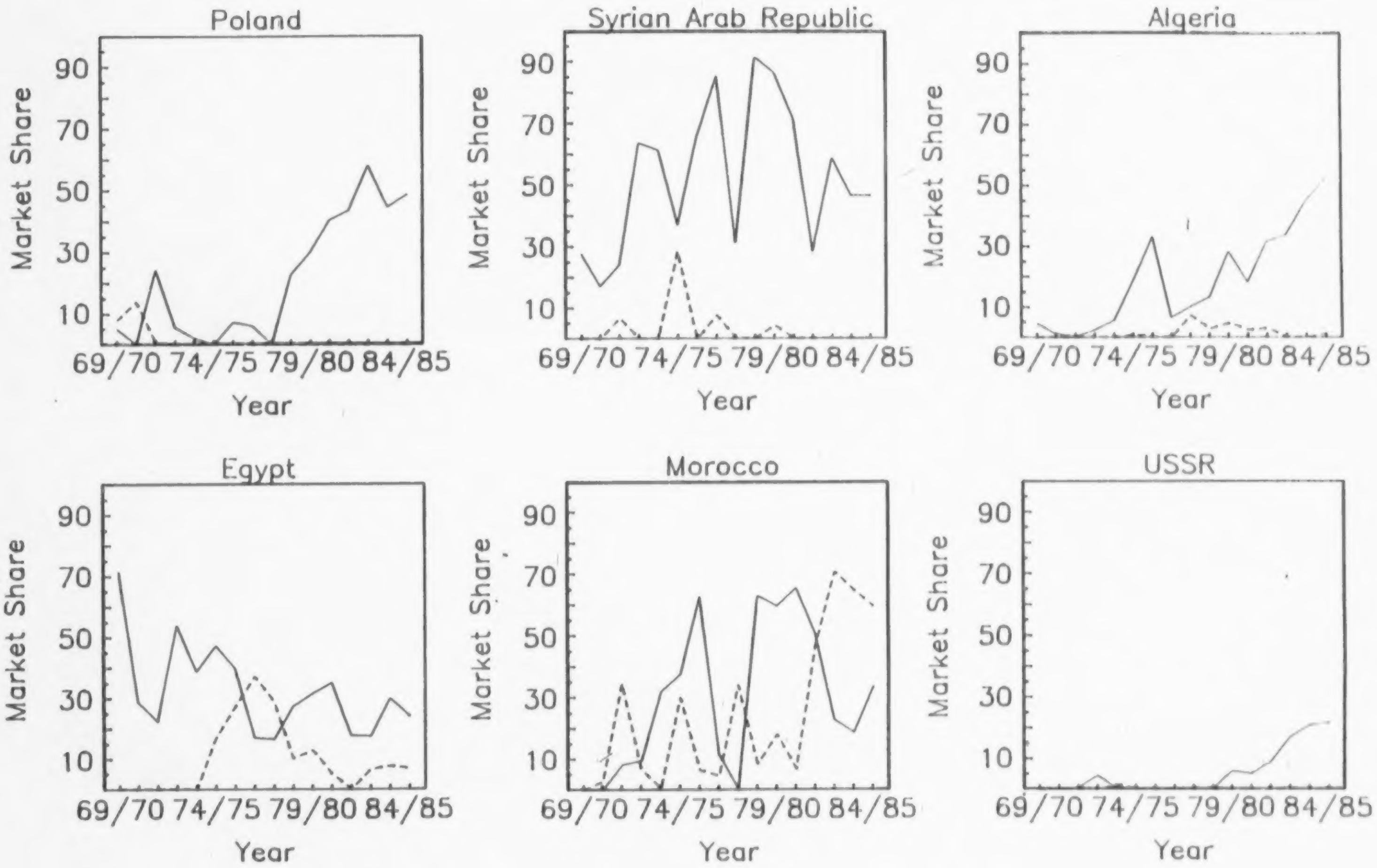

Figure 2.10 Market Share for EC (—) and US SRW(---) to Selected Countries

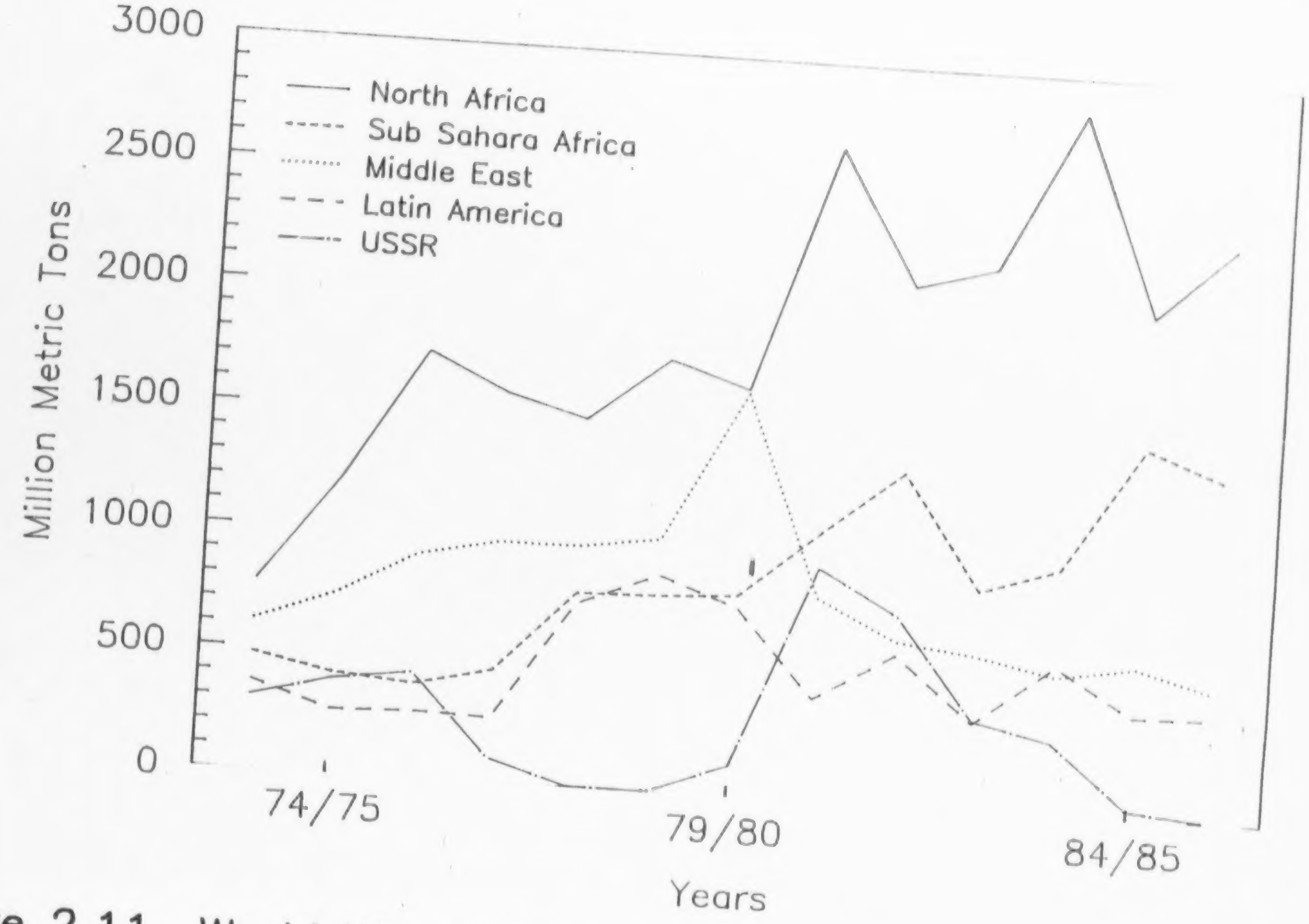

Figure 2.11 World Wheat Flour Exports to Major Destinations

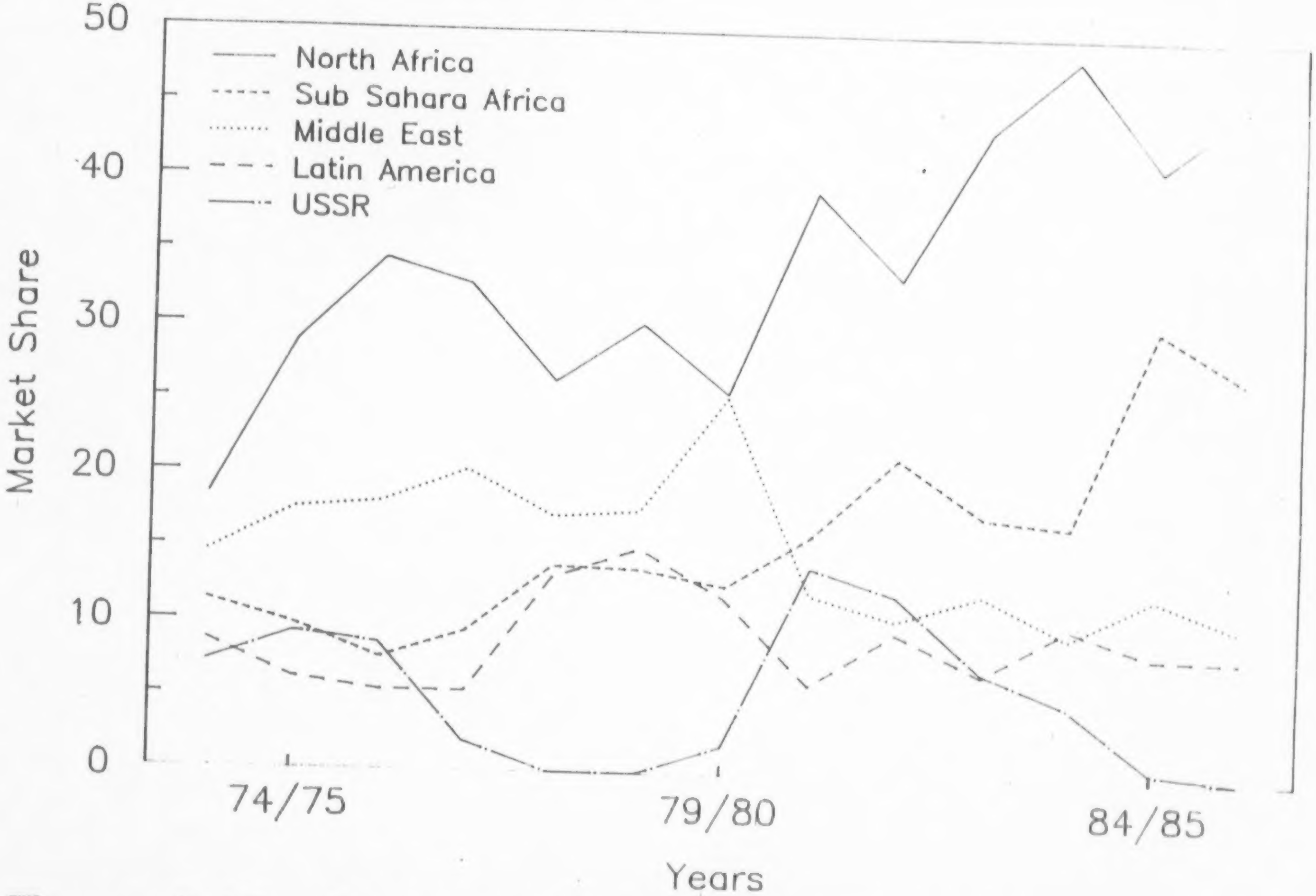

Figure 2.12 Share of World Wheat Flour Exports at Major Destinations

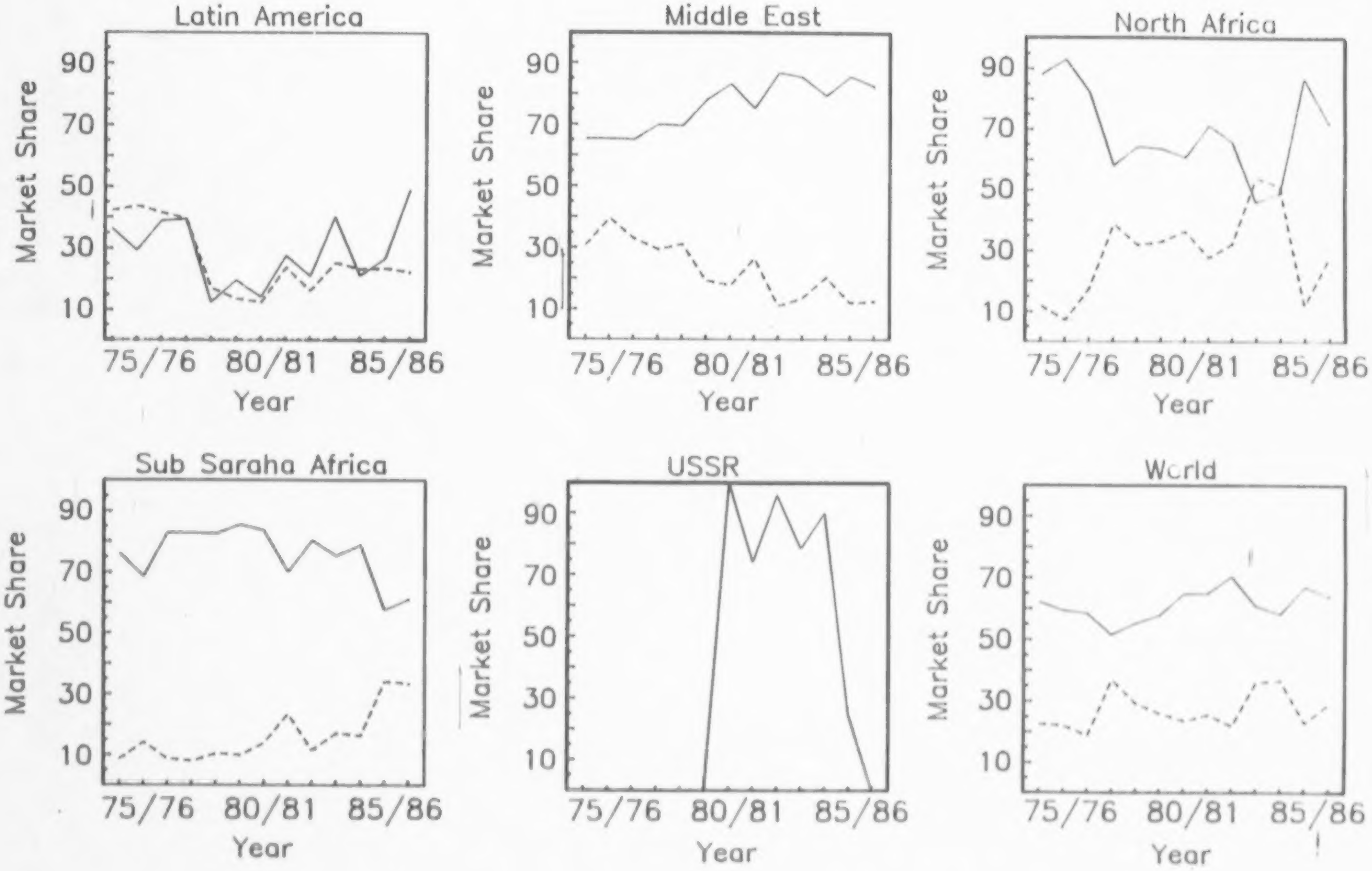

Figure 2.13 Flour Market Share for EC (—) and US (---) to Selected Countries

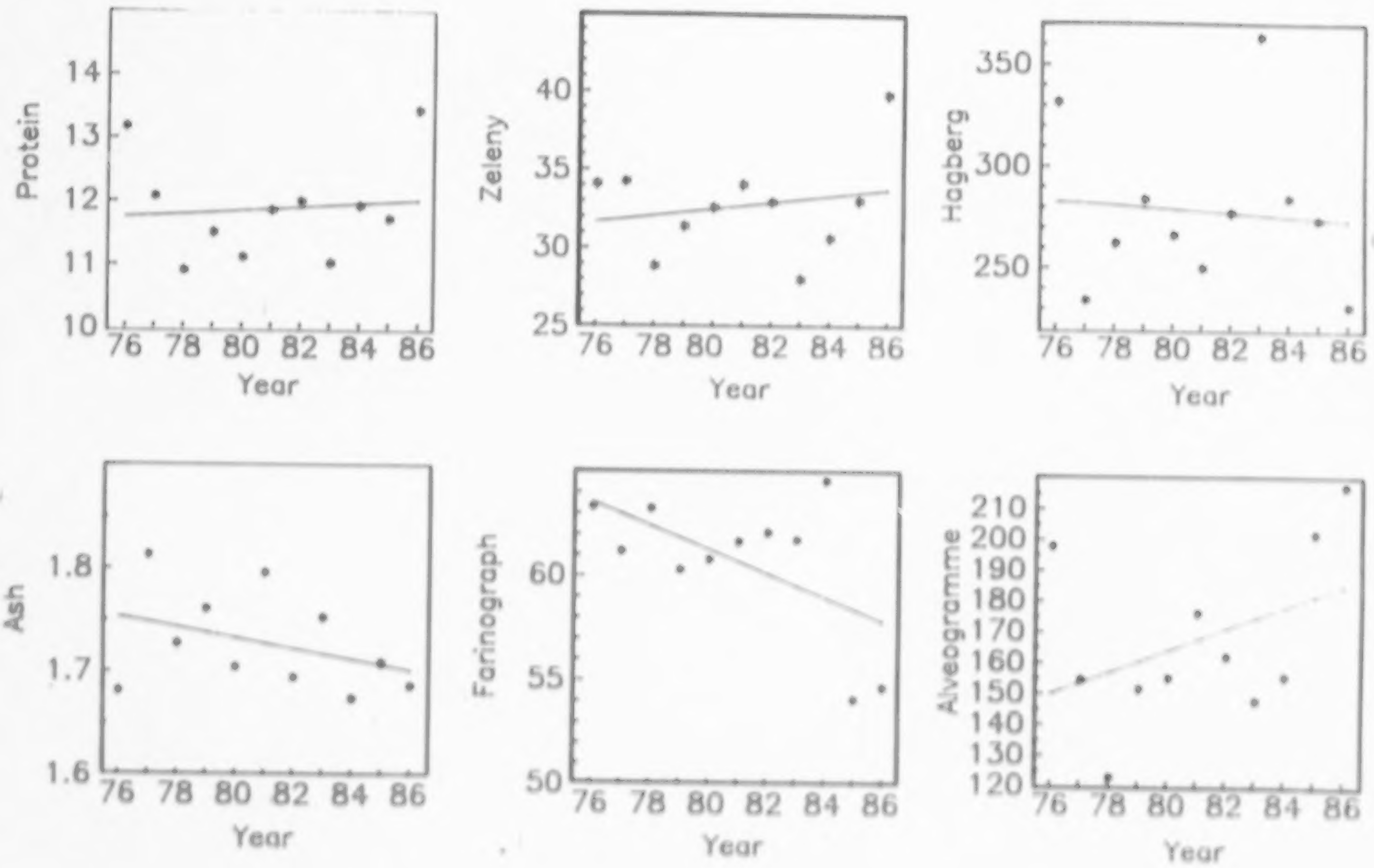

Figure 2.14 Trends in Wheat Quality in France, Superior Wheat (• actual data and – predicted)

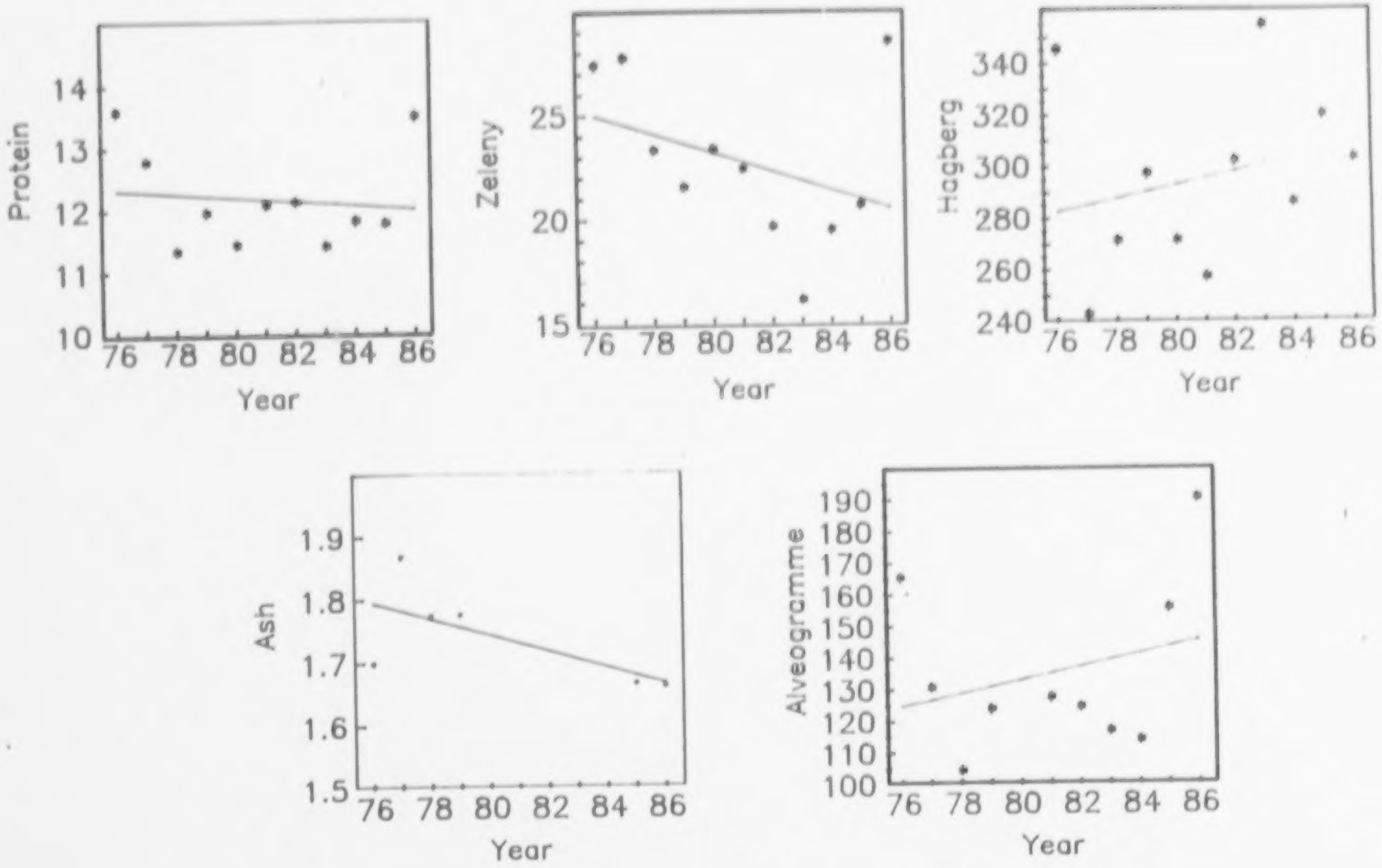

Figure 2.15 Trends in Wheat Quality in France, Standard Wheat (* actual data and – predicted)

III. Price and Income Policies in the EC

A. Overview

In 1962 the Common Agricultural Policy (CAP) was enacted which is the overriding policy affecting agriculture in the EC. The purpose of the CAP was to have coordinated agricultural policies across countries within the EC. Specific goals of the CAP were to encourage increased production, stabilize markets, ensure a fair standard of living to the farm sector, and to encourage security of supply. To achieve these goals there were three overriding principals to the CAP: 1) create a single community market; 2) an internal preference for community products; and 3) common sharing of policy costs.[3] Given these objectives of the CAP a very complex system of mechanisms has evolved to regulate the market. This section provides a brief overview of these mechanisms, and the following subsections provides greater detail particularly on how the CAP influences quality. As discussed below in detail, there are no official grade standards in the EC or individual countries, and it is the criteria for the intervention price mechanism which has important impacts on quality control. Further, there have been distinct efforts to change these criteria through time to achieve policy objectives.

Agricultural markets on the EC are subjected a complex system of prices and regulations. The most important include target and threshold prices, intervention prices, variable import levies and export subsidies. The target and threshold price are somewhat generic and are not directly influenced by quality. The target price reflects the price that EC producers should receive for their grain. The threshold price is related to the target price by marketing costs and represents the minimum price for importing wheat. Given that world prices are generally less than the threshold price a variable import levy (VIL) is calculated generally as the difference between these prices (e.g., threshold price minus world price). Complex adjustments are made in the VIL deviations to acount for quality differentials of imported wheat and external marketing and transportation costs.

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[3] Most of the material in this section is taken from: Newman, Fulton and Glaser; USDA, FAS, Foreign Agricultural Circular, FG-42-31; and various issues of Toepfer International.

Due to the fact that EC domestic prices generally exceed world prices, and due to the increased production, the CAP uses an export restitution or subsidy to allow disposal of surpluses. In general, the export subsidies are the difference between local and world prices. Actual export refunds can be established by traders using fixed refunds for each zone ("droit commun"), or by tender. Increasingly in recent years this latter has become the dominant mechanism. As a result the EC has had increased discretion about the value of export refunds. In the past these refunds have been generic across the quality of wheat being exported. However, in 1986/87 the EC allowed a 10 ECU/MT larger subsidy for milling wheat being exported from France, versus the feed wheat being exported from the UK. The purpose of this differential restitution was due to the quality differences between France and the UK, the former being superior. However, the differential has been eliminated in 1987/88 due to the deteriorated quality of the French crop, and likely due to the political problems of administering differentials between countries.

B. Recent Developments in EC Prices

The single most important policy instrument affecting producer price levels and quality in the EC is the intervention price (IP). It is at this level at which the EC is obligated to purchase wheat so long as it meets certain quality and eligibility criteria. The IP in the EC is similar to the U.S. loan rate, both providing a price floor below which local prices seldom fall. An important difference however is that there is 100 percent eligibility in the EC so long as quality requirements are met, whereas in the US producers have to be program participants.

Intervention prices are negotiated in ECU's (European Currency Units) which is a common price across all member countries. MCA's (Monetary Compensatory Units) then apply to individual countries for currency translation. Thus, prices in a local currency may change in the opposite direction of a change in the IP if there has been a change in the MCA. Intervention prices and MCA's are set annually by the European Commission for the first month of the marketing year. Monthly increments are legislated for sales to intervention in later months.

The EC also sets price differences in the IP for different qualities of wheat. The recent history of EC policy prices are shown in Table 3.1. Target and threshold prices increased through 1983/84, decreasing moderately thereafter. Beginning in 1982/83, the European Commission was starting to be concerned about the EC prices getting out of line with world prices. However, program prices did not begin to decline until 1984/85. Intervention prices generally changed in the same magnitude as the target price.

During the period 1976/77 to 1984/85 the EC implemented a differential price policy in wheat called the "Silo Concept." Prior to that period of time, IPs for wheat exceeded that of feed grains, and there was a growing relative surplus of bread wheat, and continual shortage of feed wheat. Thus the silo concept was designed to reduce the incentives for producing bread wheat and stimulate use of wheat for feed. To that end, the intervention price for feed wheat was lowered to be equal to that of feed grains, and a higher reference price was introduced for various qualities of bread wheat. However, only limited quantities of bread wheat were eligible for the higher

TABLE 3.1. EC GRAIN PRICES, 1981/82 - 1987/88

Year	Target Price	Threshold Price	Intervention Price			Reference Prices[1]	
			Quality	Bread	Feed	Medium Quality	Minimum Quality
	ECU/MT						
1981/82	231	226	--	--	165	193	185
1982/83	251	246	--	--	179	209	199
1983/84	261	256	--	--	185	215	204
1984/85	259	254	--	--	183	213	196
1985/86	255	252	179	179	179		
1986/87	256	251	183	179	170		
1987/88[2]	256	251	183	179	170		

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[1] Applied between 1976/77 and 1984/85 as part of the silo scheme. Minimal quality requirements had to be met, and default was to the "Feed Wheat" intervention price.

[2] Intervention prices do not reflect 6 percent adjustment for intervention during 1987/88.

intervention price and these had to be intervened within the first three months of the market year. In 1984/85 the spread between these wheat types was also reduced. Despite the higher reference price for bread wheat, the intervention mechanism was never used which would imply that market prices for these wheat types exceeded the relevant reference price. The goals of the silo concept were met by the early 1980s and the plan was abandoned and replaced by an undifferentiated intervention price for wheat in 1985/86. In the most recent years a spread was introduced for bread wheat (9 ECU/MT) and quality wheat (13 ECU/MT).

Generally local market prices exceed the intervention price. Figure 3.1 shows the intervention price and market price at principal EC locations. In most periods the intervention price was less than market prices, thereby making the intervention mechanism largely inoperable. However, in recent years local market prices were increasingly intersecting the IP, thereby making the intervention mechanism more attractive.

Given the downward pressure on market prices relative to the IP in recent years, the European Commission has adopted a number of measures to reduce the use of the intervention mechanism. Two of these have been direct reduction in the realized intervention price. As of July 1986 the EC introduced a co-responsibility levy of 5.38 ECU/MT, or 3 percent. This is essentially a tax on production to be collected at the point of first sale. The European Commission originally proposed a tax of 5.7 percent, but accepted 3 percent in the negotiation process. The purpose of the tax was to "make producers feel the realities of the market." Realized intervention prices were reduced another 6 percent beginning with the 1987/88 marketing year. Effectively the intervention agency of each country could pay only 94 percent

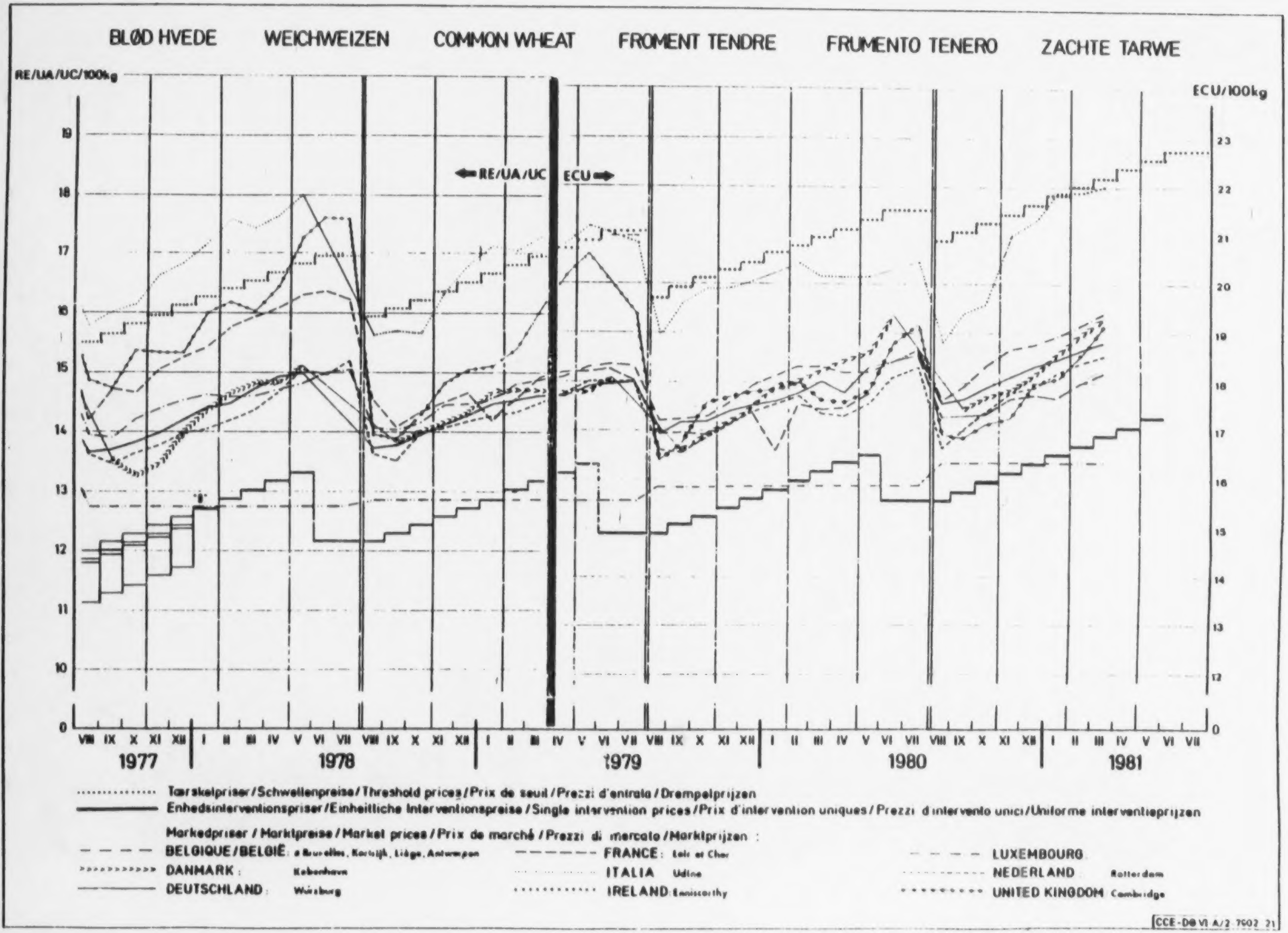

Figure 3.1. EC Intervention Prices, 1977-81.

of the nominal intervention price, and only during certain periods. These adjustments are ex-post and therefore not reflected in the prices shown in Table 3.1. However, the point is that the effect is to reduce the floor under which producer prices are supported.

In addition to the above there have been three indirect actions introduced through time which essentially reduce the attractiveness of the intervention. First, the period in which grain could be eligible for intervention has been reduced. Second, in recent years payment is deferred. In 1987/88 for example, payment would be deferred for 110 days implying a foregone cost of interest of 3-4 percent. Third, the minimum quality standards to be eligible for intervention have been periodically tightened. These changes are discussed below in detail.

C. Administration of the Intervention Price Mechanism

Each member country in the EC has an intervention authority who is responsible for administering EC policies. That in France is Office National Interprofessional Des Cereales (ONIC). In the case of France, only licensed elevators, (O.S.) are eligible for selling grains to ONIC--i.e., producers cannot use the programs directly as in the U.S. If an OS elevator decides their best marketing option is the intervention mechanism, they contact ONIC with quality specifications and location. ONIC can take possession or ask the OS elevator to store it for them under a negotiated rate. ONIC pays the OS after the deferred time period discussed above, including monthly increments in accordance with the month of sale. Quality is determined at the expense of the seller. If either party rejects the first analysis of quality, a second may be used, the results of which are binding. Costs of the second analysis would be at the expense of the losing party.

In general one of the responses of the European Commission in recent years has been to tighten the quality standards to be eligible for intervention. The effect of this is to reduce the attractiveness of the intervention mechanism resulting in lower market prices. The quality requirement to be eligible for intervention are shown in Table 3.2 for various time periods. The requirements were consistent during the period 1982/83 -1985/86. Since then there have been a number of changes.

In the EC system there are three types of wheat for purposes of intervention--feed, bread, and quality. In some cases the factor limits are the same of each type. The principal differences between bread and feed wheat are the end-use characteristics represented by germination, falling number, protein, sedimentation and a dough test. Thus to be eligible for the higher intervention price of bread wheat, minimum levels of these characteristics are required. If these characteristics are sufficiently high the wheat would be eligible for the intervention price for quality wheat.

There have been a number of important changes in recent years. Falling number requirements were increased, and protein decreased, for bread wheat in 1986/87. Test weight was increased for feed wheat from 68 to 72 Kg/hl in 1986/87, even though the EC recommended higher levels. Another end use test, germination, was introduced for bread and quality wheat in 1986/87. There has been much controversy about changes in moisture requirements. In 1986/87 moisture was decreased from 16 percent to 14 percent for bread wheat and feed wheat. However, actual implementation was at the discretion of the individual countries, and allowances were made up to 15 percent if subjected to adverse weather. In 1987/88 the individual countries were allowed to fix higher ceiling levels for moisture. Some chose 15.5 percent, and others including France, chose 15 percent.

TABLE 3.2 EC INTERVENTION QUALITY REQUIREMENTS FOR WHEAT

		Feed Wheat			Bread Wheat			Quality Wheat	
		1987/888	1986/87	1984/85	1978/88	1986/87	1984/85[2]	1987/88	1986/87
Sound basic grain	% min	88	88	88	88	88	90	88	88
Moisture[1]	% max	14.5-15.5	14	16	14.5-15.5	14	16	14.5-15.5	14
Natural weight	Kg/Hl min	72	72	68	72	72	72	72	72
Broken grains	% max	5	5	5	5	5	5	5	5
Grain and mixture	% max	12	12	12	12	12	5	12	12
Inc. shrunken kernels	% max	12	12	12	12	12	--	12	12
Impurities	% max	3	3	3	3	3	3	36	3
Sprouted grains	% max	6	6	8	6	6	6	6	6
Germination		--	--	--	85	--	--	85	--
Falling no.		--	--	--	220	220	180	240	240
Protein[3]		--	--	--	9.5	9.5	10.5	14	14
Sedimentation		--	--	--	20	20	--	35	35
Dough test[4]		--	--	--	positive	positive	--	positive	positive
Relevant intervention price (ECU)		170	170	183	179	179	196	183	183

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[1] Differs by country.

[2] Factor limits listed are for the "minimum quality" reference price to be eligible for the "medium quality" reference price protein must be 11.5 percent, sedimentation 25 and falling number 260.

[3] (N X 5.7) of dry matter.

[4] First stage of the European baking test.

The intervention prices described in Table 3.2 are subjected to legislated premium and discounts for certain quality factors. Implicit in the prices is a premium of 3.59 ECU/MT for quality wheat over bread wheat, and 9 ECU/MT for bread wheat over feed wheat. Other adjustments exist for moisture, test weight, and individual factors. Premiums for low moisture begins at 13.4 percent and is 0.17 ECU/MT per decimal point. Discounts for test weight begin at 76 Kg/hl, even though the absolute minimum is 72 Kg/hl. Following are the test weight discounts:

76 - 75	- .84 ECU/MT
75 - 74	-1.69
74 - 73	-2.53
73 - 72	-3.37

Discounts for protein level for bread wheat begin at 11.5 percent with an absolute minimum of 9.5. These discounts are:

11.5 - 11	-1.69 ECU/MT
11 - 10.5	-3.37
10.5 - 10	-5.06
10 - 9.5	-6.75
9.5	-8.43

Note that the discount for protein less than 9.5 percent results in the feed wheat prices. Discounts also apply to the other factors beginning at levels less than the maximum:

	Discounts Begin at:	Discount Rate ECU/MT Per 1/10 Percent	Maximum
Broken grains	3%	.084	5
Sprouted grains	2.5%	.084	6
Impurities	1%	.169	3
Grain admixture	5%	.084	12

Consequently, the intervention price mechanisms include price differentials for indigenous quality differences, and for extraneous differences.

IV. Wheat Marketing Industry.

The grain marketing system in France is dominated by farmer-owned cooperatives for origination, and multi-national traders for exports to third countries. Transactions between parties are largely determined by private negotiations with some terms standardized. Most of the conditioning of grain which does occur does so as the point of origination. The purpose of this section is to describe the marketing system for wheat in France. Subsequent sections provide detailed information on market channels, the organization of the industry, storage, marketing technologies and conditioning practices, the organization of the industry. In the final section a detailed description of pricing and commercial practices is provided.

A. Marketing Channels

About 70 percent of all grain which enters the marketing system is originated by farmer-owned cooperatives, the balance by private and multinational traders. Grain shipped for domestic use is largely by truck, and to a lesser extent barge and rail. Most flour mills are located close to the point of production, and are relatively dispersed, thereby requiring transport over relatively short distances.

There are 16 ports in France which export grain (World Grain), but the Port of Rouen dominates with 47-53 percent of total grain exports. Table 4.1 shows the distribution of exports by the largest ports. The largest four ports in 1985/86 handled 76 percent of the grain exports from France.

The Port of Rouen handled about 7 percent of the market in international trade and is the world's largest port for flour. Rouen handled

63 percent of the wheat exports from France. In 1985/86 the distribution of exports across grains from Rouen were:

Wheat	6.4 MMT
Barley	1.4
Corn and Others	.3
	8.26

Thus, about three-fourths of the grain handled by Rouen is wheat. Grain arrives at Rouen by truck, barge, and rail as the distributions are shown in Table 4.2.

Truck is the dominant mode, likely due to the relatively short distance to the port. However, rail transport has been increasing. Unit trains are commonly used with 20 cars and holding 60 tons per car (a total of about 44,000 bushels per train). Shippers can use either their own cars, or those of a pool owned by private companies. Barges are active in northern France but have difficulty competing with railroads because the latter are indirectly subsidized by the government.

At the Port of Rouen there are eight export-elevators, with six operators--three coops, and three private and total storage capacity of about 1.0 MMT. There is also extensive bagging facilities (766,000 MT were exported in bags in 1984/85) with a new mechanized export terminal for handing bagged cargoes (World Grain). Recently, automatic sampling equipment was installed in the export terminals, subsidized by ONIC which operates a wheat certification center. At the port of Rouen there are six private surveying companies, and two private laboratories who are responsible for sampling, grading, and certification.

TABLE 4.1. GRAIN EXPORTS FROM FRENCH PORTS

Port	1983/84	1984/85	1985/86	1986/87	1987/88
			MMT		
Rouen	5.49	8.90	8.26	7.5	7.0
LaPallice	.77	1.52	1.64	--	--
Bayonne	1.26	.75	1.05	--	--
Dunkerque	.34	.54	.84	--	--
LeHavre	1.11	1.25	.60	--	--
Others					
Total	11.55	16.06	15.42	--	--

SOURCE: Data from the Port Authority of Rouen.

TABLE 4.2. INBOUND GRAIN SHIPMENTS TO ROUEN

Year	Truck	Barge	Rail
	Percent		
1983/84	53	24	23
1984/85	42	25	33
1985/86	44	26	30

SOURCE: Data from the Port Authority of Rouen.

B. Organization of Firms in Wheat Marketing

There are three key components in the French wheat marketing industry. One is the farmer-owned cooperatives largely involved in origination, and to a limited extent, exporting. The second is the private grain traders, some are French and others are multi-national. These firms specialize largely in CIF sales. The third is the domestic milling industry. General characteristics of each are discussed in this section.

Cooperatives

Much of the present marketing system is based on the developments which occured in the world wheat economy of the 1930s. At that time ONIC operated as a national market board and all grain had to be sold to OS (increased storage facilities elevators. These are licensed elevators whose function in part is to collect taxes and administer quotas. The concept of the OS elevator still exists today, even though ONIC no longer operates as a national wheat board. Any firm could be licensed as an OS elevator so long as certain conditions are met.

A large proportion of the grain is delivered to the local OS elevator at the time of harvest due to generally limited on-farm storage. Mechanisms are set up through ONIC and the OS elevators for financing of harvest sales. Farmer-owned cooperatives are the dominant first handler of grain in France, with about 70 percent of the origination (Table 4.3). They are similar to structure to those of the U.S. Functions performed by these elevators include origination, conditioning, storage, financing, and input sales.

There are two national unions of cooperatives. One of these is UNCAC which was originally created to promote production and export of French grains. It represents about 60-65 percent of the local cooperatives. In the last five years UNCAC has been active in exports, in part through its (recent) affiliation with Toepfer. About 70 percent of their export sales are made intra-EC, the balance being to third countries. As a matter of policy they are not active in domestic transactions (e.g., to processors) which would be competitive with their members. The other national cooperative UGCAF is not active in exports and is primarily involved in inputs.

The local elevators (visited by the authors) largely operated multi-plant satellite type systems. Many collection points exist for origination, storage, conditioning and to some extent, transhipment to larger houses. Two examples include the Sarthe and CAVAC. Sarthe has 15,000 members and sales are distributed with 30 percent from crops, 30 percent from livestock, and 40 percent from inputs. They operate 60 collection points with shipments either by truck or rail depending on the logistical economics. Total storage capacity is 320,000 MT. Sarthe is affiliated with UNCAC. CAVAC is located in west central France, has 100 silos, but only six or seven large ones. Total storage capacity is 165,000 MT and 60 percent of the grain handled is exported through their own export elevator.

Exporters

Most of the grain exported from France is by the multi-national exporters, though there are several private French exporters (e.g., Levy, Souffle). Also, as indicated above, cooperatives are involved in exports to a limited extent, particularly to other EC countries. Some of the exporters operate their own facilities, while others simply buy FOB and make CIF sales. Only a few of the private exporters are involved in origination (Table 4.3) largely because of the dominance of the cooperatives as first handlers. Cargill is recently expanding in country origination. The private exporters are dominant in sales to non-EC destinations. An important risk, perhaps the single most important, in exporting is that of fixing restitutions with the EC

TABLE 4.3. DISTRIBUTION OF GRAIN IN FRANCE

	Percent	MMT
Production	100	46
Domestic Use	39	16
Feed		8.7
Flour		4.6
Semolina		.5
Mauserie		.1
Malt		.3
Commercialization (originated)		40
Cooperative	70	
Private merchants	27	
Multi-national	3	
Exports (total)	61	24
Intra-EC	49	
Third countries	51	
Exported as Processed Products		
Flour	.67	
Malt	.23	

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[1] All grains.

SOURCE: Economies and Finances Agricoles, Ferrier 1986.

for third country sales. Thus, the risk of restitutions and documentation apparently provide significant barriers to small scale exporting from France.

Milling Industry

The flour milling industry in France is very diverse and fragmented (much of the material in this section is from World Grain, September 1987). Most of the farms are family owned, and about 20 percent of the capacity is owned by cooperatives. There are a total of 1,215 mills which produced 5 million MT of flour in 1985. The largest milling company is Grand Moulin de Paris which has 15-20 percent of the market share and produces 900,000 MT of flour from 14 mills. It is the dominant exporter and is also involved in the gluten industry. There are a total of 17 mills which produce in excess of 50,000 MT/year, and more than 600 produce less than 1,000 MT/year. The mills are dispersed geographically and are largely located at the point of wheat production.

An important reason for the current structure and operating practices of the industry is that of a quota system. In 1935 there were 9,000 mills, flour consumption was declining and there was a surplus of wheat. In order to control supply a quota mechanism was implemented with maximum allocations of wheat per mill. Thus, even though many firms exited the industry the remaining could not readily expand output. The quota system still exists today but its administration has been liberalized. Part of the reason for the tremendous competitiveness of flour exports from France is that if the flour is exported, then the purchase of wheat is exempted from quotas. Thus, firms with excess capacity, and likely relatively low marginal milling costs, could utilize that capacity for export.

An important feature of the milling and baking industry in France is that of gluten. This is an industry which began in the mid-1970s which extracted gluten from wheat. Gluten is used as an additive to low protein wheat to produce leavened breads. This technological development has been an important growth industry in France and the EC, and has provided much flexibility for the millers in meeting contract specifications.

C. Storage Capacity and Elevator Equipment

Storage capacity in France is concentrated at the country elevator level. Table 4.4 shows elevator storage by location and type at two time periods. In January 1985 total storage capacity was 53 MMT, and for comparison total grain production in France in the past six years has ranged from 46-59 MMT. Nearly one-half of the capacity is at the country elevator level, followed by on-farm and terminal silos. Most of the storage capacity at the country elevator level is controlled by cooperatives. In 1985 the average turnover rate (average of the best marketed production over the past five years divided by total storage capacity) of the country elevator sector was 1.56.

There is a drastic disparity in the average size of elevator. Forty percent of the country elevators have less than 1,000 MT storage capacity, and can hold about 5 percent of the marketed production. Most of the country elevators serve as collection points and ship to more central elevators for conditioning and reshipment.

Selected characteristics of the elevator sector in France are shown in Table 4.5. In 1986 64 percent of the elevators were cooperative and the average capacity was 3,833 MT. Most of the country elevators are served exclusively by truck with about 20 percent and 4 percent also served by rail and truck, respectively. The average size terminal elevator is 20,195 MT.

TABLE 4.4. STORAGE CAPACITY FOR ALL GRAINS IN FRANCE (1985 AND 1986)

	Capacity		Percent	
	--------------MMT--------------			
	January 1985	August 1986	January 1985	
On-Farm	17.5	NA	33	
Silos and cells	10.2	NA		19
Threshing floors	5.2	NA		10
Corn cribs	2.1	NA		4
Country elevator	25.8	29.4		
Cooperatives	18.5	21.5	49	
Private merchants	6.0	6.5		35
Other	1.3	1.4		11
				2
Terminal silos	5.6	6.9	11	
Marketing centre	2.1	2.7		4
Sea ports	1.4	1.6		3
River ports	2.1	2.6		4
ONIC (rented)	2.2	2.9	4	
Processors	1.94	1.99	4	
Wheat milling	1.14	1.14		2
Feed	.80	.85		2
Total	53.0	--	--	--

SOURCE: Data from the Port Authority of Rouen.

TABLE 4.5. TECHNICAL CHARACTERISTICS OF THE ELEVATOR SECTOR IN FRANCE

	Country Elevator						Terminal Elevators							
			Private				Marketing Center Locations		Port Elevators					
	Cooperatives		Merchants		Total[1]				Sea		River		Total	
	1985	1986	1985	1986	1985	1986	1985	1986	1985	1986	1985	1986	1985	1986
Number	4841	4900	2630	2578	7661	7671	169	216	54	55	62	71	285	342
Average storage capacity (MT)	3835	4381	2268	2535	3368	3833	12526	12520	26830	29008	33172	36715	19728	20195
Modal shipping facilities (%)														
Rail	22	22	13	13	19	19	49	44	96	98	71	73	63	58
Barge/ship	6	5	2	2	4	4	14	9	100	100	100	100	49	40
Average modal shipping capacity (MT/hr)														
Rail	71	77	62	63	70	75	149	159	213	152	165	129	176	162
Barge	84	108	125	100	120	113	127	159	547	431	201	204	321	302
Truck	66	75	43	46	59	66	95	110	271	131	131	137	127	119
Elevator equipment														
% with dryers	30	30	31	32	30	31	17	13	13	15	34	49	20	17
Average drying capacity (points/hr)	1227	1344	991	1027	1166	1242	1484	1479	3350	3350	1843	2078	1869	1903
% with ventilation	76	76	73	75	75	76	64	65	65	--	82	83	68	69
Average cleaning capacity (T/hr)[2]	--	39	--	27	--	35	--	1241	--	192	--	101	--	73

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[1] Total includes "elevators in common", other in addition to cooperatives, and private merchants.

[2] Calculated as average cleaning capacity per elevator assuming every elevator has a cleaner.

SOURCE: 1985 data is as of January 1, 1985 from USDA Attache Report FR-5084 American Embassy, Paris. Data for 1986 is as of August 1986 and is from "Evolution Des Capacities De Storage," Office National Interprofessional Des Cereals, November 1986.

Nearly one-third of the country elevators are equipped with dryers, but only 17 percent of the terminals have dryers. However, the latter have greater capacity. Most of the elevators have ventilation equipment. The average cleaning capacity at the country elevator level is 35 MT/hour, but that at the terminal elevator is substantially greater.

D. Conditioning[4]

In general, grain is conditioned (dry, clean, treat for insects) at the first receiving grain elevator. Since grain is conditioned when stored, it is not subject to deterioration in storage. Country elevators and receiving points are equipped with modern technology. Cleaners, barley sizers, dump pits, loading legs, belts, and augers were similar to those found in elevators throughout the United States. Based on the small sample there did appear to be more use of the Redler Chain Converyor in place of belt conveyors more common in the U.S. We also observed a different type of storage facility in which from the outside appeared to be a long, flat building, but the inside consisted of numerous vertical bins. These bins were often filled by a long converyor, either belt or chain, running the length of the long building under the roof with the individual bins filled by a diversion off the chain conveyor. Sampling equipment differed markedly among individual elevators, one using a very primitive type of pan or bucket at the endgate with one or more samples being used to represent the truck load. Others had hydraulic operated vacuum probes. There appeared to be no requirement on the part of government agencies as to the method of sampling. This was left to the discretion of the individual operators.

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[4] Observations in this section are based on a tour by the authors of selected facilities throughout North and West France.

Drying

Wheat and corn in France are harvested at moisture levels above that normally experienced in the United States. Until 1987, wheat has had a base moisture of 16 percent in intervention standards. This base then carried into the market channel. A reduction of intervention moisture level has required that wheat be dried to 15 or 14.5 percent. All the firms that we interviewed insisted that 16 percent moisture could be safely stored. With the change in intervention base, their pricing and discounts were also changed. Regardless of intervention moisture, most wheat is apparently harvested below 15 percent moisture in normal seasons. In some regions and in some years weather prevents drying in the field and some wheat is dried at the elevator. Since essentially all wheat is stored off the farm following harvest, drying takes place at the first handler or shortly after delivery into the market channel. Based on interviews, drying of wheat is relatively infrequent.

Corn in France is harvested at much higher moisture levels than in the United States. Shrink tables for example, go up 50 percent moisture content. Moisture levels reported by producers and elevators indicated that 30 percent is not unusual for corn harvested as shelled corn. This means high temperature dryers are essential. In some regions shelled corn is stored on the farm. One of the farms which we visited had a form of batch-in-bin dryer with an oil-fired burner. High temperature dryers at the elevator were similar to those used in the U.S. We also encountered elevator managers who because of concern for breakage, were using two-stage drying or aeration for removing the final moisture points of moisture. Much of the corn in the Loire Valley has been harvested in the ear and stored in long, very narrow cribs. Under these circumstances, drying takes place through natural aeration. However, grain handlers in the region reported problems with mold and alfatoxin from corn stored in this manner. The heavier grain production region father south in France is apparently harvesting with combines and the ear cribs are not in general use outside of this one region.

Cleaning

Throughout the market channel we found the question of impurities and broken kernels to be or minor concern, especially for wheat. We were repeatedly told that farmers deliver clean grain (below 0.5 percent impurities) and that cleaning is seldom necessary to meet the export or intervention limits. Millers, however, have more stringent requirements and we encountered a variety of responses. Some country elevators cleaned every load as it was delivered from the farm and recleaned again as the grain was being loaded out of storage for delivery to the millers. However, at least one miller indicated that country elevators did not properly clean their grain and that it was necessary for them to reclean at the mill. We in fact observed the cleaners in operation at one mill, removing significant quantities of stones, straw, and other impurities. It was not clear if the same type of cleaners and scalpers were being used at both locations or if the mill cleaning was a more refined form of removing all of the non-millable materials to a level below that delivered from the country elevators. At any rate, cleaners were present at every mill and every country elevator. We occasionally found cleaners at export elevators but saw little evidence that they were used except for extraordinary and very unusual situations. Producers were paid net of the screenings which is reflected in the final payments. Primary incentives for cleaning at the country elevator level include: 1) contracts include a maximum 2 percent impurities: 2) to reduce storage problems; 3) resale of screenings; and 4) millers generally expected clean wheat even though the contract limits may be loose.

In the case of corn, cleaning was more frequent because of the broken kernels especially after the grain had been dried. However, country elevators again emphasized that farmers delivered clean corn into the market channel. Export elevators gave contradictory statements in terms of industry practices. Some insisted that cleaning and blending was necessary to meet the standards for export or milling with respect to broken kernels. Others insisted that broken kernels presented no problem. This may differ with where the drying takes place and the cleaning prior to their receiving the grain for export shipments.

Blending

Variety is extremely important to the French wheat industry, especially at the farm, country elevator, and flour miller level. When it comes off the farm wheat is placed in bins by groups of varieties according to milling yield and baking characteristics, good, average, feed wheat, etc. Although some blending of different qualities does occur on wheat moving to export channels in France, there does not seem to be the desire or necessity to blend wide margins of different qualities.

E. Pricing and Commercial Trading

Central to any marketing system is implementation of institutions and policies in commercial transactions. The purpose of this section is to describe the trading practices and commercial relations between market participants. In the first section below, an overview of the commercial aspects of grain trading is provided. This includes discussion of standards, inspection, contracts, and premiums and discounts. The second subsection provides details and examples of pricing and contracts at each point in the marketing system.

Overview

There are several aspects of the grain marketing system in France which significantly impacts the commercial operation of the grain trading system. First, there are no "official" standards with factor limits and grades in France. There are EC standards as described in Section III but these are for intervention purposes only. At least in the past only a very small proportion of the wheat went into intervention and consequently these were of little direct impact. However, they do have an indirect impact because the EC standards for intervention prescribe the characteristics which are measured, some of which reflect end-use value. These have been adopted in part or in whole in commercial transactions. Second, variety plays a key role in some transactions. It is not uncommon for variety to be specified in contracts and in some cases certain varieties are excluded. A third important component is that there is not an "official" inspection agency (i.e. as FGIS in the U.S.). Private surverying companies compete in the provision of this service. Where appropriate the contract appoints the surveying company. In general, quality is specified as per private contracts and negotiations with terms varying across transactions. Quality limits and delegation of surveying/inspection companies are negotiable terms of a commercial transaction. In cases where surveying/inspection agencies are not required (e.g., flour mills) then it is the long-term commercial relationship between participants which assures the integrity of the system.

Grain trading is facilitated in part through the use of the "Paris Contract." A copy of the Paris Contract and others referred to in this section are in Appendix B. This is a contract which prescribes standardization to grain trades and provides integrity through arbitration. This contract provides standardized terms regarding delivery, quality, etc. The Paris Contract therefore is used extensively for hedging purposes, with trades being as far as 9-months forward. In addition, the Paris Contract is used for the purposes of procurement, in some cases, such as by exporters. However, for others such as flour millers, greater specificity is needed and the Paris Contract is not used for procurement, though it be used for hedging. The Paris Contract has specific quality requirements. Typically those specified are: specific weight 76 kg/hl; 15 percent moisture, 4 percent broken, 2 percent impurities, and 2 percent sprout. For comparison these are greater than those required for EC intervention (Table 3.2).

In addition there are several addendums, one each for feed and milling wheat, in which provisions exist for slight deviations in quality. Specific premiums and discounts are established in this contract for deviations in quality and for the exclusion of varieties. The deviations from specified quality standards are the limits beyond which the merchandise can be rejected.

Premiums and discounts play an important role in valuation of particular lots of grain as well as in the allocation across end-users. Premiums and discounts for deviation in quality exist throughout the marketing system in France and are established by market pressures. There are, however, two mechanisms which influence actual premiums and discounts. One is the premiums and discounts and associated factor limits which exist in the intervention price mechanism described in Section III. These are fixed for each market year by the European Commission and apply only to grain entering intervention.

The Paris contract also establishes premiums and discounts and associated limits. Copies of commercial contracts, including the Paris

Contract, are included in Appendix C. Table 4.6 shows the discounts and allowable limits for both feed and milling wheat. For each factor, tolerances from the contract specification are given, and a maximum deviation. At that level the buyer has the right to reject and/or the contract is settled by arbitrage. In several cases the discount rate increases for higher levels of deviation (e.g., moisture, impurities). In the milling wheat contract varieties can either be specified, or excluded, and different tolerances apply. Evaluation is based on 50 grain samples. For example in a specified variety contract of 80 percent of one or more varieties then 40 grains out of 50 would have to conform and following would be the discounts:

38-39	grains out of 50	no discount
37	grains out of 50	1/2 percent
36	grains out of 50	1 percent
35	grains out of 50	1-1/2 percent

Samples with less than 34 grains of the specified varieties could be refused or settled by arbitrage.

All of these discounts are expressed as a percentage of price. A recent example is that despite the abnormally large supply of sprouted wheat in the 1987 crops, the trade decided not to increase the discount but rather allowed it to be reflected in flat prices. An interprofessional committee meets periodically to review these discounts but in general they have not changed appreciable in percentage terms. These discounts apply to all grain which are delivered subject to the terms of the Paris Contract. Consequently, at least in principal the discount rate does not vary across regions in response to locational supply and demand conditions, but the actual amount discounted varies depending on the quality characteristics of a particular lot.

An important feature of the French marketing system is that variety is often a contract term. Variety is used as a proxy for end-use quality. In

TABLE 4.6. PRICE ADJUSTMENTS IN THE PARIS CONTRACT FOR FEED AND MILLING WHEAT[1]

Factor	Discount Rate[2,3]	Unit	Maximum Deviations Before Arbitrage
	----percent-----		
Test weight			
Feed	1	1 kg/hl	3 kg
Milling	1	1 kg/hl	2 kg
Moisture	1	first 1%	
	1-1/2	second %	2%
Broken	1/4	per point	3%
Sprouted	1/2	per point	3%
Impurities	1	per point 1-2%	
	2	per point 2-4%	4%
Hagberg[4]	1/1000	per second	15 seconds
Protein[4]	0	0.0-0.29%	
	1.2	.30	
	1.6	.40	
	2.0	.50	50%
Zeleny[4]	0	1	
	0	2	
	1.2	3	
	1.6	4	
	2.0	5	6%
Variety[4,5]			
Specified[6]	0	0-2 grains of 50	
	1/2%	3 grains of 50	
	1%	4 grains of 50	
	1-1/2%	5 grains of 50	5
Exlcuded	0	0-2 grains of 50	
	1/2%	3 grains of 50	3

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[1] Unless indicated otherwise price adjustments are the same for milling and feed wheat.

[2] Adjustments are made to pre-tax prices.

[3] Prorated per 1/10 percent.

[4] Apply to milling wheat only.

[5] Based on samples of 50 grains and using electrophoresis.

[6] Varieties in contracts are either specified, or excluded.

practice varieties are specified as either an individual variety, a category of varieties or excluded varieties. Given that varieties are in general not usually distinguishable, various mechanisms described below are used to assure the integrity of variety specification. Premiums and discounts also exist in commercial transactions for specific varieties.

Trading Practices

Producer/Elevator Transactions

Prices are generally calculated from some central market place, sometimes the intervention level, sometimes from the export market (e.g., Rouen). From these prices adjustments are made in deriving producer prices. Following is an example of derivation of producer prices in Sarthe, located in northwestern France:

		Cost	Price
		------F/MT------	
Delivered Rouen			1245
Transport		-60	
Loaded Sarthe			1185
Taxes	French[1]	-46	
	EC co-responsibility	-40	
Coop handling		-100	
Price to producer			999F/MT

[1] Includes 4-5 taxes collected at point of first sale.

For comparison the relevant intervention price at Rouen is 1180 F/MT and 1110 F/MT for milling and feed wheat respectively. There is no use of futures markets at the country elevator level. Sales are either made back to back (facilitated in part by the Paris contract) or are covered by the intervention price with the increments for storage over time.

There are three basic alternatives for producer pricing. The dominant form of pricing is referred to as "Account Pricing" which essentially is a pooling mechanism by individual cooperatives. About 2/3 of the wheat is purchased by first handlers using this alternative. Under this alterantive, producers receive about 90 percent of the expected total price at the time of sale. In the example above the account price was 950 F/MT, the balance to be paid at a later point in time after which adjustments are made for quality deviations etc. Note that the dominance of this alternative is due to the predominance of cooperatives in originating grain and that the cooperative by definition is selling for the account of the producer. The second alternative is for total payment at the point of delivery. About 30 percent of the transactions use this mechanism. The third alterntive is for delayed pricing. Only about 3 percent of the transactions use this alternative. In one case storage charges were not used because of the monthly increments in the intervention price. In another case farmers were free to sell under a quoted delayed price, and storage was provided by the elevator with charges to the producer, giving him the option of selling out of elevator storage at the time of his choice.

Several procedures/mechanisms are used at the country elevator level to verify the variety. First, in most cases the cooperative has sold seed to the producer thereby knowing its variety. Sales of certified seed ranged from 40-50 percent in one region to 80 percent in another. Second, producers must declare the variety at the time of first sale on the "Acce" certificte. These certificates were originally implemented for tax purposes (they can be obtained at Tabac shops) but also provide this important additional purpose. Penalties exist for incorrectly stating the variety on this statement. Third, cooperatives have the capability of evaluating questionnable lots by a fairly rudimentary procedure acid procedure, or by requesting an electrophoresis from a laboratory. However, normally these are not required given the above. By knowing the varieties at the time of receipt country elevators are capable of binning by varieties, or categories, or varieties and selling on the basis of varieties. In general the mechanisms described above are adequate for assuring variety at the point of first sale, however, one cooperative (Sarthe) indicated they have periodic problems with ascertaining and segregating by variety.

As described above, actual premiums and discounts for deviations in quality depend on market pressures. However, the premiums and discounts of the intervention programs and the Paris Contract override determinants of premiums and discounts at specific markets. Some indicated that actual premiums and discounts exceed those of the Paris Contract (Levy) which would suggest they are implicitly used as a competitive tool. Others indicated elevators typically adopt those of the Paris Contract since that is the basis on which sales are made.

An example of a discount schedule is shown in Table 4.7. Discounts were not taken for other factors such as impurities. The discounts for germinated wheat in general did not begin until 10 percent, however, they indicated these would not apply this year. Instead, they planned to use the Hagberg test and make adjustments in the final payment.

In the case of moisture a base is established in the industry, generally on the basis of EC intervention standards. Moisture levels above that base are adjusted first by a set of shrink tables and secondly, by charges for drying. In the case of corn, for lower moisture levels (below 25 percent) the shrink table follows actual water loss based on the mathematical formula. However, at higher moisture levels, the shrink factor increases to

TABLE 4.7. DISCOUNTS FOR COOPERATIVE DE LA SARTHE, AUGUST 4, 1987

Net Wheat Price 95 F/100 Kg

Factor	Allowable	Price Adjustment	
Broken	2%	F/100 kg - .63 per point	
Germinated	10%	10.1-15	- 1.0
		15.1-20	- 2.0
		> 20	- 3.0
Test Weight	76 Kg/hl	75 - 75.9	- .63
		74 - 74.9	- 1.26
		73 - 74.9	- 1.89
		72 - 72.9	- 2.52
		71 - 71.9	- 3.52
		70 - 70.9	- 4.52
		69 - 69.9	- 5.52
		.	
		.	
		.	
		65 - 65.9	- 9.52
		> 65	- 9.99

the advantage of the buyer.[5] The base moisture for wheat was 15.5 percent; higher moisture was adjusted by weight shrink; any wheat containing over 16.5 percent received additional discounts (presumably a drying charge).

No premiums or discounts were attached to protein content but were implicitly reflected for variety. Premiums and discounts for varieties were applied to categories of varieties. Examples which were quoted varied substantially but generally were:

Premium for Top Milling	5 - 10
e.g. Festival	5 - 15
	10 - 20 F/100 kg
Discount for feed	2 - 5
	3 - 5 F/100 kg

These are from a base price of 95 F/100 kg. For perspective normally these have been premiums of 1-3 for milling. Thus, due to the apparent abnormally poor quality of the 1987 crop, the premium for top quality milling wheat has increased.

Flour Millers

Procurement of wheat by domestic wheat millers is premised largely by careful coordination and specification with sellers and/or through competitive pressures for performance on quality criteria. Flour millers typically have a long list of quality criteria which are important including: moisture, ash, protein, falling number, gluten, extraction, alveograph, farinograph,

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[5] For example, drying 100 bushels of 35 percent moisture corn to 15.0 percent results in 76.47 bushels calculated by the formula. The table provided by the elevator and apparently used throughout the industry shows remaining bushels are at 75.25 for that moisture content. The drying charge on that published form is even more erratic. For example, the first point of moisture removed is charged at the rate of .58 francs per quintal. At 30 percent moisture the charge is .62 francs per quintal per point of moisture removed. At 35 percent this drops down to .57 francs per quintal per point, and at 40 percent moisture the rate calculates to be .53 francs per qunital per point of moisture removed. This is not a uniformly graduated scale but one that first increases and then decreases with higher moistures.

Zeleny, extensograph, and baking test. However, these are not all used in quality specifications for individual purchases--it would be impracticle to do so. However, these tests are conducted at some stage in the procurement process.

Factors specified for individual shipments typically include those of the Paris Contract. In addition, limits may be specified for gluten strength (alveograph and/or Zeleny) and falling numbers (Hagberg). Many of these end-use characteristics are also represented in (or captured in) the variety specification. As an association, the millers categorize varieties according to milling characteristics. Purchasers then specify the particular variety, or use a category of varieties, or exclude particular varieties. Variety verification is done at the mill using electrophoresis since individual varieties are not visually distinguishable.

Actual procurement of wheat generally can take one of two forms. One is simply careful contract specification, with the right to refuse for deviations. Implemention is somewhat subjective but emphasis is placed on commercial and competitive relationships between buyer and seller. The consequences to a seller of incorrectly shipping wheat out of contract (e.g., by variety) are simply exclusion from subsequent purchases. The other procurement procedure which apparently is used more extensively, especially by smaller mills, involves visits to individual country elevators. By doing so mills can take samples from individual bins, seal the bins, and evaluate quality at their own laboratory. Purchases will then be made based on the quality evaluations. In the extreme case purchases could be made of the individual sealed bins. Note that this is the ultimate in purchases based on samples.

Export Specification

Procurement of wheat by merchants for exporting nearly always use the Paris Contract. One trader indicated that 80 percent of the wheat exported is to third countries is procured using this contract. Depending on the circumstances of the re-sale variety may or may not be excluded in the purchase. Exporters also work closely with the private surveying/inspection companies in procurement. These companies provide a multitude of useful services including: overall crop quality evaluation at particular locations; coordination of quality evaluation and control at the point of origination with that of export specification; and supervision and quality evaluation at the point of export. As an example in order to assure that quality of an export contract is met, an exporter may specify the same surveying/inspection company for origination and destination.

Specifications vary across all importing countries. First a distinction must be made between exports to other EC countries, and those to third countries. In both cases the sale and function of the private surveying/inspection companies is similar. Sales to some EC countries use the German-Dutch contract (DNV No. 7) (see Appendix C). This allows for FAQ, or other quality specifications, and use destination grades. Exports to all other EC countries use origin grades and quantity. It is not uncommon for exports to EC countries to exclude varieties.

Quality specification, as well as designation of the surveying/inspection company, in sales to third countries are all part of the contract. Buyer typically use Paris Contract terms regarding physical factors such as test weight, broken, sprouted, etc. However, in addition, due to the heterogeneity of buyers, further specifications vary across importers. In the case of the USSR for example, specifications include 11.5 percent protein and

23 zeleny. In the case of Algeria, the list of specifications include, hagberg, protein, zeleny, alveograph (W), machineability, sprout, test weight, impurities, and ergot (see (Appendix C). The point is that no official standards exist for export. Each transaction has the possibility of including a multitude of physical and intrinsic end-use specifications. These are facilitated in part through coordination between buyer and seller, and through the use of surveyors/inspectors.

No formal mechanism exists for handling foreign buyer complains regarding quantity. These are purely contractual and subject to competitive pressures. However, one trader indicates that if a big problem developed ONIC would investigate.

V. Variety Development and Release

The background information in Section II demonstrated that productivity growth in France has exceeded that of all other exporting countries and there has not been sacrifices in quality. In fact, there have been improvements in quality along several dimensions. Also the previous section indicated that the French marketing system places tremendous emphasis on the variety, or categories of varieties, as indicative of end-use quality. France has a rigid system for the development and release of varieties. This operates through a catalogue of official varieties which being on is a prerequisite to production and marketing of seeds. Certain criteria have to be met for a variety to be considered, including both agronomic and end-use quality. This section explains the institutions regulations, and industry in France which administer the development and release of seeds.

Two government agencies under the authority of the French Minister of Agriculture, control the release of new varieties and the production and distribution of seed for wheat, corn, and soybeans and others. GNIS controls the production and distribution of certified seed regulating many of the same factors used in seed laws in the United States--purity, germination, accurate labeling, etc. The regulations are promulgated and enforced by various departments in GNIS. Their authority extends to the contracts between seed companies and growers.

Control of new varieties is achieved through the Comite Technique Permananet de la Selection des Plantes Cultivees (CTPS). This committee is composed of representatives of plant breeders (in fact every breeder is automatically invited to designate a rerepresentative), producers, millers, and other users. There are 55-60 members on this committee, evaluating every potential new variety. This committee sets the criteria, establishes the tests, evaluates the results and recommends to the Minister of Agriculture those varieties to be registered in the official French catalog. Without this approval it is unlawful to multiply and sell the variety in France.

A third agency indirectly involved is the Technical Institute for Cereals and Forages (ITFC). ITCF was created in 1959 as an association between the Farmers Union and the Cereal Producers and Cooperatives and is financed by a tax of 3.7 F/MT on cereals. It has responsibility for research and extension and is working primarily for the benefit of producers and their cooperatives. Most of the responsibility for testing and quality evaluation resides with ITCF, but other research agencies and laboratories--private and public--also provide test facilities.

Annually a catalogue of varieties (Catalogue Official Des Especes et varieties) is published which lists all the varieties of a particular crop which are licensed. Selected pages of the catalogue for wheat are shown in Appendix D. These are varieties which have been recommended to the Ministry of Agriculture by CTPS for release. A variety can only be produced and marketed legally after it is registered and listed in this catalogue.

All varieties are subject to automatic removal from the registry 10 years after registration. A variety may be removed at any time if problems arise. The catalogue is a licensing mechanism, but it is also the market mechanism, subject to the catalogue restriction, which determines what is produced. In 1986 for example, the top three varieties (Festival, Fidel, and Camp Remy) were seeded on 45 percent of the area planted.

CTPS is essentially the committee responsible for determining whether a variety is approved. In general both agronomic and quality factors are considered. However, before a variety is accepted for testing by CTPS it must meet three general criteria: (1) distinguishable--the variety or line must differ from other known varieties on at least one important morphological or physiological characteristic. In the case of wheat protein, chemistry is evaluated through electrophoresis to establish a unique pattern that is used as a "fingerprint" for that variety, even in commercial sales where variety is specified; (2) homogeneity--a variety or line is considered homogeneous if the tested plants reproduce the same genetic characteristics as other plants selected from the same variety or line. In the case of wheat, 200 seeds are planted and no more than two plants may be differentiated by physiological or morphological characteristics. A bulk seed test is also required in which fewer than three plants in 1,000 may be differentiable; (3) stability--a line is considered stable if successive generations conform to the original essential characteristics.

CTPS has developed a system grading for candidates for registry that allows for a trade-off between yield, agronomic characteristics and end-use quality. Basically each new variety must be proven superior to existing varieties on either quality or productivity to obtain approval. This is achieved by selecting a "witness" variety in each region, to serve as the standard against which the new variety is measured. This "witness" variety is generally the most popular variety planted by farmers. In the case of wheat, a tableau exists with yield vs. quality in a two-way matrix (see Appendix D) with a quantitative scale. Any new variety must equal the yield of the witness and be equal to the average yield of all new varieties under test. The tableau differentiates between bread quality wheat and feed quality wheat. Additional points may be garnered for insect and disease resistance. As an example, the quality parameter is "W" from the alveograph (a measure of strength)[6] and comparisons are made to "Capitole" which is a variety released in 1964 and reinstated in 1984. If a variety being tested has a W equal to 90 percent of Capitole, then the yield would have to be between 97 and 106 percent of that of Capitole, depending on other agronomic characteristics. These are fairly formal and rigid mechanisms and all breeders are aware of the tableau.

In the case of corn (and feed wheat), the primary criteria is yield. Other agronomic considerations include rate of maturity, resistance to lodging, tolerance to cold at planting time, and susceptibility to insects and disease. As with wheat there is a numerical scale of points. Each variety is given a score between 0 and 5 for resistance to diseases and insects with zero being very susceptible. Although end-use quality is less important in registering corn than in registering wheat and the tests are less extensive, quality corn generates a maximum of 10 points on the registration score card. The points for quality are assigned by CTPS, on the basis of type (white corn gets an automatic 5 points; waxy and opaque 10), protein and oil. The minimum oil content for garnering points is 10 percent, 4 to 8 points above traditional commercial varieties.

Breeders also have responsibilities in evaluating the acceptability of new varieties. They must submit a dossier covering morphology and physiological characteristics, based on trials at three locations. At the same time, the breeder furnishes seed to CTPS for distribution to independent testing locations in regions designated by the breeder. Yield and quality tests as well as the tests for distinction, homogeneity, and stability are conducted by the breeder as advance information and simultaneous information. Testing for entry into the register is conducted by INTA and ITCF in test plots distributed over the appropriate growing region for the variety. Varieties may be approved for one or more regions. Quality tests include all traditional tests of chemical properties plus actual baking tests conducted by ITCF. These tests provide a check on, as well as additional information to, the tests conducted by the breeder and reported in the dossier required in the original application for registration. CTPS evaluates a submitted variety for two years. Typically CTPS accepts 200 varieties the first year and narrows it down to 35 for the second year of evaluation. Generally, up to 10 new varieties are released each year.

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[6] The zeleny test was used previously and abandoned. However, the EC has since incorporated Z into the intervention mechanisms thereby making the Z score were important.

Time required for testing, approval, and distribution of new varieties has been shortened by many breeders, who gamble on approval and multiply the seeds while the tests are underway. GNIS estimated seven years between identification of a new line and commercial distribution of the variety. A commercial breeder estimated a minimum of four-five years but with an additional four years of research preceeding the identification of the new line.

The Paris International Convention was adopted in 1961 to provide plant variety protection. Under this authority breeders are assured protection for varieties at both products and marketing for up to 25 years. New varieties are generated by public and private researchers. There are currently about 120 private and cooperative companies producing new varieties of wheat and nearly 70 percent of the new varieties of all seeds have originated in the private sector. Industry comments place this ratio above 95 percent for new wheat varieties. INRA has been the major public institution generating new varieties of wheat and maize. A private breeder stated INRA had produced only one successful variety of wheat in the last 10 years. They have been more successful in the development of maize varieties.

Plant breeders, farmers, millers, and government were nearly unanimous in their approval of the protection offered by the French system of variety control and in the success of the system in fostering yields and higher quality of wheat. The only criticism related to the lack of statistical tests in making comparisons and occasional lack of objectivity in making allowances for effects of unusual weather.

VI. Quality Control in France

The purpose of this section is to describe the details of grading, sampling, and inspection in France. Following a brief overview the first sub-section describes handling practices, and subsequent sub-sections describe sampling, grading, inspection, and weighting authority. The final section provides a brief description of quality control in flour exports.

A. Overview

There are four important features of the French marketing system which have an overriding impact on the organization of (or implementation) the system for grading and inspection some of which were discussed in Section IV above. First, there are no official standards which establish standardized numerical grades. There are EC standards which were described in Section III, but these are only used for intervention purposes. Private contracts for trading purposes have evolved and in a sense serve the purpose of providing standards for trading.[7] Second, the private contracts specify important factor limits and premiums and discounts for deviations (however, the penalties are substantial). In addition variety, or sometimes excluded varieties are contract terms. There is a great deal of emphasis in the French marketing system on variety which has been incorporated into trading, thereby making variety identification critical. Third, there is not an official agency with the responsibility of sampling and inspection. Private surveying companies play this role. Fourth, throughout the marketing system there is great emphasis on commercial relationships and competitive pressures which assures the integrity of the system.

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[7] ONIC tried to implement official standards with numerical grades during the early 1980s but were abandoned due to non-use.

Private contracts specify each quality factor individually. These contracts may vary to some extent within the domestic milling industry, but are somewhat standardized for procurement, and sometimes sales by exporters. The typical wheat export contract provides for the factor specifications listed below.

Test Weight	76 kilograms per hectoliter (59 lbs. per bushel)
Moisture	14.5 - 15 percent
Broken Kernels	4.0 percent
Sprouted Kernels	2.0 percent
Impurities	2.0 perent not more than 0.5 percent may be miscellaneous impurities

In addition most contracts may require chemical tests to determine milling or baking qualities. These may include electrophosis for variety verification, zeleny (Z) and the Hagberg falling number.

B. Grain Handling Practices

Grain handling practices at various points in the marketing system are described in Tables 6.1-6.3. Wheat is segregated typically by variety or groups of varieties and cleaning is done at country elevators.

Insects are seldom a problem. Grain is checked for insects throughout the marketing system; when insects are found the grain is immediately fumigated. Some elevators treat with a contact insecticide as the grain is placed into bins. Empty bins are treated before placing grain into them.

C. Sampling and Grading

Sampling and inspection practices are described below at each point in the marketing system. In addition, certification and the extent and use of government agencies in the inspection system are discussed. Throughout the system a number of factors are measured depending on the terms of the

TABLE 6.1 GRAIN HANDLING PRACTICES AT COUNTRY ELEVATORS

Activity	
Receival/Binning	Wheat is cleaned and placed in bins by variety according to milling and baking characterstics.
Drying	Wheat is seldom dried even though it is often harvested at 16.0% mo. Corn is harvested at 25-35% mo. Corn is either dried or stored in cribs on the farm.
Cleaning	Effective weed control results in a low leve of misc. impurities (FM & Dockage). Most elevators clean grain before placing in bins for storage. All country elevators have cleaners.
Insect Treatment	All bins are treated before storing grain. Many elevators treat with a contact insecticide as grain is placed into bins.
Storage	Generally stored in silo type bins but not for the purpose of blending at time of loading. Grain is often turned and sampled for end-use quality tests.
Disposal of Screenings	Generally sold to feed manufacturers. Is never added back to grain once removed.

TABLE 6.2 GRAIN HANDLING PRACTICES FOR INTER-ELEVATOR MOVEMENTS (INCLUDING INBOUND TO EXPORT)

Activity	
Receival/Binning	Most grain has already been cleaned, but they do bin by end use quality factors.
Drying	Most corn is dried as it comes off the farm, therefore there is little need to be concerned with drying on inter elevator shipments.
Cleaning	Since most grain is cleaned when it comes off the farm there is little concern with cleaning. Some cleaning is done at time of shipment depending on the specifi-cations of the contract. There is a desire to ship clean grain so as to please the customer.
Screenings Disposal	Generally sold to feed manufacturers.
Blending	Some blending on wheat moving to export channel is done. There does not seem to be the desire or necessity to blend wide margins of different quality. Seldom are more than 2 bins blended together. No blending done on grain delivered to French millers.

TABLE 6.3. GRAIN HANDLING PRACTICES AT EXPORT

Activity	
Receival/Binning	Received & placed in bins according to end use qualities. Grain not meeting export contract specification is rejected by the export elev.
Drying	Very few export elevators have driers; grain is conditioned prior to arriving at export elevator.
Cleaning	Most export elevators do not have cleaners. Grain is expected to be clean when it arrives at export elevator or it is rejected.
Screening	Since most elevators do not have cleaners grain is expected to be clean when it arrives at export elevator or it is rejected.
Insect Infestation	If one live insect is found loading is stopped and a decision is made as to whether the vessel will require fumigation.

TABLE 6.4. FRENCH GRADING PROCEDURES

Factor	Measure	Procedure
1. Test weight	Kg/hl	Kilograms per hectoliter determined (in most cases) by use of Dickey John Grain Analyser (GACII)
2. Moisture	1/10%	Determined (in most cases) by use of the Dickey John Grain Analyzer (GACII)
3. Extraneous Matter	1/10%	Sieve 100 grams (in some cases 2 separate 50 gram portions) over a 1 mm sieve. All material passing through is extraneous matter. This becomes a component of the factor impurities. (see impurities below)
4. Broken Kernels	1/10%	From the above sieved sample portion remove all broken kernels. This includes all kernels of which the endosperm is partially uncovered and from which the germ has been removed.
5. Sprouted Kernels	1/10%	From the above sieved sample remove all sprouted kernels (the line on sprout is similar to U.S.)
6. Misc. Impurities	1/10%	Includes material that passes through the lum sieve plus weed seeds, husks, chaff, straw, sand stones, etc. (FM and dockage combined in U.S. standards) and damaged kernels such as mold, heat damaged, smutty, etc.
7. Grain Impurities	1/10%	Includes shriveled kernels, of the above 100 gram sample that passes through a 2mm (5/64) X 20 mm sieve, plus kernels that are frost damaged, green damaged, insect damaged, sick damaged, other grains and all material included from miscellaneous impurities above.

contract. The procedures and measurement of these factors are described in Table 6.4.

Samples are obtained by various methods, from hand dipping to mechanical diverter samples depending on location and who is obtaining the sample. Portion sizes for analysis are reduced to a workable size by different methods. Sample dividers such as the boerner are seldom used. More often than not the samples are hand mixed and hand dipped from a container. The final portion analyzed is hand adjusted to obtain the exact portion size desired.

Producer deliveries of grain are sampled and inspected when it arrives at the first receiving elevator. Every load is inspected by elevator personnel.

Producer deliveries are sampled and inspected when it arrives at the first receiving elevator. Every truck load is inspected by elevator. Samples are obtained in a variety of ways from a mechanical trier to a quart container which is used to obtain the grain as it flows from the truck to the dump pit. Most all producer grain is sampled and inspected by elevator employees. Each inbound truck or trailer is tested for test weight and moisture. Broken, impurities, and sprouted kernels are also examined but this varied some depending on the elevator and the overall quality of the crop. Some elevators run a falling numbers test rather than pick for sprouted kernels. Producers must also declare the variety of wheat. Each load delivered must be accompanied by a document that declares the owner, weight, taxes, variety of wheat, and other identification and quality information.

Wheat is binned at the country elevator varieties representing milling yield and baking characteristics. Some elevators will turn and sample the grain from each bin in order to run various end use tests that were too technical and too time consuming to conduct ath the time of harvest. This practice is sometimes done in conjunction with the French millers who are searching for good quality milling wheat. Other elevators maintain composite samples of all the grain placed into each bin. The composite sample may be used for analysis. Either way the elevator operator has an good idea as to the physical and chemical qualities of the wheat in each bin.

Generally grain moving to mills is not sampled or inspected because the mills request specific wheat varieties that have undergone chemical tests and that meet the desired baking requirements. Grain moving to export chanels is either sampled and inspected at the shipping point or at the receiving elevator by a surveying company depending on the terms of the contracts. Grain shipped between elevators must meet the quality specified in the export contract. Grain not meeting specified export contract may be rejected by the surveying company or receiving elevator.

The first step in the physical exporting process is to examine the vessel for condition. The vessel holds must be clean, dry, and free of live insect infestation. If a single insect is found the vessel is declared unfit to loan grain. During loading, the grain is sampled continuously by private surveying company employees. Three export elevators that were visited had mechanical samplers. Two of the mechanical samplers were diverter type and the other was a point type sampler. Mechanical samplers were located in the elevator after final elevation, similar to the U.S. The sample is analyzed each hour between 500 and 2500 MT sublots. In addition to the mechanical sampler a surveyor is also stationed near the end of the loading point. A sample is obtained from the running stream by use of a quart size cup with a handle. This sample is taken immediately prior to the grain going into the vessel. It is checked for test weight, moisture, and odor, and visually examined for impurities, sprout and other factors which may effect the grain quality. This process alerts the surveyor if grain does not meet the quality specified in the contract 100 perent of the time and the grain flow to the vessel is immediately stopped. A zero insect tolerance is a matter of practice. If a single insect is found, the grain is treated in the ship's holds. The elevator selects the fumigant and the surveying company monitors fumigation. Samples at the mechanical sampler site are reduced to an appropriate size by use of a type of cargo divider. Portion sizes for analysis in the lab were reduced to a workable size by hand mixing and hand dipping. The final portion worked is hand adjusted to the exact portion size desired. Hand adjusting reduces the accuracy of analysis. The inspection process is relatively simple and is performed in a lab at the export elevator. The quality factors listed under item "quality factors for wheat" in this report are analyzed for each sublot. The analytical results of each sublot are recorded on a loading log. These logs vary in design from elevator to elevator. (For an example, see Appendix E). A detailed explanation of the sampling and inspection system is provided in Table 6.5.

There is no government agency which exercises authority over quality or quantity of grain as it moves through market channels. The only government agency which may influence quantity or quality is the "Service des Instruments de Service" (weights and measures). They test all inspection and weighing equipment annually for accuracy. This includes grain industry and surveying company equipment and instruments.

Private surveying companies such as SGS, Thionville, etc., provide the closest thing to uniform inspection. They inspect all grain moving in export channels and at the request of the interested parties, provide inspection at interior locations in France. SGS handles by far the largest percentage of inspection, but other surveyors may be used depending on the terms of the contract. These private companies generally follow the procedures established by EEC Regulation No. 273175 dated 29 October 1975: (See Appendix No. F).

Inspection procedures vary considerably throughout the marketing system which can be expected when there is no supervising body to insure uniformity. Surveyors have tremendous control of overall export shipments to include weighing, sampling, and inspecting the grain and running chemical analysis required in the contract. They have authority to stop loading when grain does not meet the quality specified by the contract. Controls to stop loading are located next to the sampling station in order to immediately stop operation if "off contract" grain is running. Exporters deliver as close to the contract quality limits as the surveying company permits. SGS issues and certificates depending on terms of contract, may accept responsibility for quality and quantity at destination (see Appendix G for an example percent on SGS Certificate).

On the job training is the sole method for training grain samplers and inspectors. There are no grain inspection schools and no visual training aids used to train inspectors. SGS does provide refresher training about once per year for their inspectors. Referee samples are used periodically to determine if proper interpretive lines are followed. SGS also provides an on the job training program for elevator employees.

D. Export Flour

Wheat variety is extremely important to the wheat millers in their effort to process good baking quality flour. Millers often go directly to the country elevator and test wheat. Electrophoresis is commonly used for testing varieties. Mills request a specific wheat quality in their contract. If the

TABLE 6.5. SAMPLING AND INSPECTION SYSTEMS EXPORT

Activity	
Responsibility	As required by the contract a surveying company is hired to inspect export grain. ONIC may be request ed by some state traders, but percentage of ONIC inspections is very low
Vessel Examination	If a single live insect in jurious to stored grain is found vessel is declared unfit to load
Export quality	Any quality of grain may be exported that is agreed to by the contract. Most wheat contracts require 75 KHL, 14.5-15% mo. 4.0% broken, 2.0% sprouted, 2.0% impurities with not more than 0.5% misc. impurities. Grain flow to the vessel is stopped whenever grain does not meet quality specified in contract
Sampling	Mechanical sample for sublot analysis. Also samples taken from belt immediately prior to loading to insure it meets quality 100 percent of the time
Insect Exam	Random examination continuously during loading by surveyors attending belt. If a single insect is found, the entire ship hold must be fumigated
Samples Analyzed	Sublot samples of between 500 to 2500 tons are analyzed. (Generally each hour) results are recorded on log
Final Grade Basis	Weighted average of all sublots analyzed and final grade determined from these results
Quality Control	Sublot samples are analyzed by surveying company. Also surveying company has employee stationed on loading belt to immediately stop loading if grain does not meet quality specified in contract. No tolerance allowed

wheat does not meet the desired specifications when it arrives at the mill it is rejected back to the shipper. The normal contract specifies the following quality factors: test weight 76 kilograms per hectoliter, 4.0 percent broken kernels, 2.0 percent sprouted. There are very few problems with biological defects such as mold, sick wheat, etc. in French wehat, but sprcuted kernels are a problem. The French millers use the NIR to test moisture, protein, starch, ash, etc.

Export flour in France moves much faster from mill to vessel than it does in the U.S. Seldom is flour placed in storage in France. It moves direct from the mill to the vessel and is almost always aboard the vessel within two weeks after milling.[8] The French seldom if ever have insect problems. French millers fumigate the mill one to three times per year for insect infestation. In France, sacked flour is transported from the mill to the port in open top box cars covered with tarpaulins. It is placed in slings and when it arrives at the port the contents of the entire car is slung from the rail car to the vessel.

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[8] n the U.S., flour is usually placed in storage at the port waiting for a vessel often for up to 30 days or more.

VII. Summary, Conclusion, and Comparisons

The EC has always been both an importer and exporter of wheat, importing primarily for blending and improving the strength of the indigenous wheat. However, in the past 10 years, exports have increased and imports have declined. The EC has become the principal exporting region which has gained market share. In recent years the EC has become particularly competitive in traditional U.S. markets, most notable being the USSR, Algeria, and Egypt. France is by far the largest wheat producing country in the EC with about 35-40 percent of the production in recent years. The purpose of this study was to analyze the policies, istitutions, and trading practices that have an influence on quality of grain which is exported. In the first sub-section below, a summary and discussion of principal findings is presented, and in the following sub-section, comparisons are made to the U.S. on particular areas of interest.

A. Summary of Principal Findings

The test of this report provides a detailed description of the French grain marketing system, and the impacts of policies, institutions, and trading practices on grain quality. Following is a brief discussion of principal findings related to quality:

1. Wheat Market Fundamentals
   a) Domestic utilization of wheat comprises about 75 percent of total use which is very large compared to other exporters. The principal use of wheat domestically is for bread products, but there has been an increase in the proportion used for feed in recent years.

   b) Only a relatively small proportion of the wheat production is stored between crop years (compared to the U.S. and other exporters), thereby minimizing problems associated with inter-year storage.

c) Wheat flour comprises about 22 percent of the wheat exports in recent years, and the EC is the largest exporter of wheat flour in the world.

2. Productivity Growth and Wheat Quality

a) The wheat produced in France is largely a winter planted soft wheat. The quality is generally a lower protein medium strength wheat and the end-use performance is likely somewhere between U.S. soft and hard winter

b) Yield growth in the EC and France has exceeded that of other exporters. The average growth rate has been 1.3 percent per year compared to .73 percent per year for the U.S. and lesser values for other exporting countries.

c) There generally has not been significant trends in wheat quality in the past 10 years. However, the quality of the 1985 and 1986 wheat crops exceeded the long-term average. This indicates that the yield growth has occured without sacrifices in crop quality.

3. Policy

a) The principal overriding policy in the EC is the Common Agricultural Policy (CAP) which includes the Intervention Price (IP) as the key policy instrument affecting producer prices and quality differentials.

b) There are no official grade standards in the EC or in individual countries, and it is the criteria for intervention which largely is adopted as minimum standards in the marketing system.

c) The intervention price includes premiums and discounts for quality factors and differences in end-use performance criteria--differences between feed, bread, and quality wheat.

d) There have been several actions in recent years to reduce the effectiveness of the IP. One has been to tighten the quality requirements to be eligible for the nonfeed intervention prices. In addition the IP for feed wheat was equated to that of other feed grains. Despite these efforts, it does not appear that the quality has improved.

4. Variety Development and Release

a) The release of varieties is subject to approval by the government. Formally, a committee exists which makes recommendations to the French Minister of Agriculture, who in turn licenses a variety.

b) Criteria for release include both agronomic and quality, and includes a trade-off between a measure of end-use performance (the alveograph score in the case of wheat) and yield.

5. Wheat Marketing Industry

a) An important characteristic of the French marketing system is that there is very limited on-farm storage. A very large proportion of grain is delivered to the marketing system at harvest.

b) The country elevator sector is largely locally owned cooperatives and exporters are dominated by private multinationals, though one national crop has an important share for intra-EC sales. Sales to domestic mills are normally direct from the country elevator.

6. Conditioning of Grain

a) As a general rule, conditioning of grain (drying, cleaning, and treatment for insects) is done at the point of first sale.

b) Drying of wheat is relatively infrequent, but is routine for corn.

c) Wheat was generally clean at the farm level due to good weed control and proper combine adjustment. However, all of the elevators were equipped with cleaners and it was a common practice to clean as the grain was received, as well as when loading out. Incentives to do so included contract requirements, resale of screenings, and as a preventative measure to reduce storage problems.

d) Wheat was segregated by categories of varieties, and the only blending which did occur was within categories. Variety is used as a proxy for end-use performance. Blending to factor limits was in general not a practice due in part to limited quality varieties.

7. Grading and Inspection

a) There are no official standards in France or numerical grades. The only official quality criteria is the requirements for the intervention mechanism.

b) Private contracts predominate for trading and specifications vary across end-users. Typical factor limits for an export contract include: test weight 76 kg/hl; moisture 1.45-15%; broken kernels 4%; sprouted kernels 2%, and impurities 2%. In addition, in most domestic transactions, and some export, several end-use performance criteria (e.g., alveograph, zeleny, etc.) are contract terms.

c) Variety also plays a very important role in some transactions, and for segregation. Variety is used because the end use performance of each variety is known, and direct measures of end-use performance are not very expeditiously measurable. In practice, transactions specify a particular variety, cateogies of varieties, or excluded varieties.

d) There is not an official agency with the responsibility for inspection. These functions are performed competitively by private firms, the designation of which may be a term of an export contract. A number of functions are performed by these firms, but of particular importance is that they have the potential to the wheat quality inbound and outbound.

8. Contracts and Trading

a) The dominant instrument used for trading is the "Paris Contract." This is a standardized contract used for hedging and trading, and includes provisions for arbitration. Embedded in the contract are premiums and discounts for deviations from specified factor limits, including varieties. These are expressed as a percent of the underlying price and are generally adopted throughout the system.

b) As a general rule this Paris Contract is not used by domestic millers for procurement, though they may use it for hedging. Instead they used highly specific contract terms for quality, including variety (or categories of varieties), and other end-use performance measures. In the extreme case

> it would not be uncommon for a miller to take samples from bins at particular country elevators, and often extensive quality evaluation, purchase specific bins from specific elevators. It is not uncommon for export contracts to include measures of end-use performance.

B. Comparisons to the U.S.

Selected comparisons are made below between the marketing system in France and the U.S. Presentation is generally organized by policies, institutions, and trading practices:

1. Policies

a. Price

France. The key policy affecting prices is the intervention price which includes premiums and discounts for factors, and premiums for wheat with superior end-use performance. The price for the lowest quality wheat is equated to that of feed grains. Efforts have been made to tighten quality requirements in recent years.

U.S. The principal price policy is the loan rate which has premium and discounts. However, these are largely for grade factors, rather than necessarily end use performance with the exception of protein. Generally these premiums and discounts have not been responsive to market conditions (Wilson, Gallagher, and Anderson).

b. Farm Storage

France. Farm policy through the CAP has not encouraged development of extensive on-farm storage. Similarly, as a result of CAP there is relatively limited inter-year storage.

U.S. The U.S. farm policy in the past decade has in general encouraged both extensive on-farm storage, as well as inter-year storage.

2. Institutions and Regulations

a. Variety Development and Release

France. Mechanisms exist which regulates the release of varieties, generally based on both agronomic and quality criteria.

U.S. There are no regulations, state of Federal, which affect release of new varieties. Release of varieties is influenced to some extent by land grant colleges. However, it is largely the market which determines the adoption of varieties.

b) Grade Standards[9]

France. No official standards exist.

U.S. Official standards are those of the Federal Grain Inspection Service (FGIS).

c) Inspection Agency

France. There is not an official agency in charge of inspection. Private firms perform this function.

U.S. All grain which is exported is inspected and graded by FGIS.

3. Trading and Commercial Practices

a) Contracts

France. Contract terms with respect to quality are determined by negotiations, largely reflecting buyers' needs. These quite often include direct or indirect measures of end-use performance.

U.S. In domestic transactions factor limits are contract terms. Class, protein level (in the case of hard wheats) and location are used as proxy for end-use performance.

b) Premiums and Discounts

France. The market determines the level of premiums and discounts but are generally those of the "Paris Contract."

U.S. the market determines the level of premiums and discounts.

c) Conditioning (cleaning, drying, blending)

France. Market pressures and contract terms provide incentives to condition grains. Most conditioning is done at the country elevator at the time of receipt. Most wheat is cleaned prior to shipment to the millers and exporters.

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[9] A detailed comparison of grade standards and handling practices in the U.S. and applications in France is contained in Appendix H.

U.S. Market pressures and contract terms dictate the extent of conditioning. However, with exception of the upper mid-west Hard Red Spring Wheat is not routinely cleaned.

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APPENDIX A

STATISTICAL TABLES

Table 2.1. Share of Wheat Production in the EC12 Countries, 1960-1986.

Country	1960-63	1970-73	1980-83	1984	1985	1986
Federal Republic of Germany	4.4	14.6	13.7	12.4	13.8	13.8
France	32.3	35.7	39.0	40.0	40.5	36.4
Italy	22.7	19.6	14.3	12.1	11.9	12.9
Neterlands	1.5	1.5	1.5	1.4	1.2	1.2
Belgium/Luxemburg	2.3	2.1	1.6	1.6	1.7	1.8
U.K.	9.0	10.2	15.5	18.1	16.8	19.7
Eire	1.1	0.6	0.5	0.7	0.9	0.7
Denmark	1.4	1.3	1.7	3.0	2.8	3.2
Greece	4.1	3.9	4.3	2.8	2.5	3.4
Spain	11.4	9.4	7.3	7.3	7.4	6.3
Portugal	1.5	1.4	0.6	0.6	0.5	0.5
Total Wheat Production (MMT)	36.5	48.0	62.1	82.5	71.5	70.3

Source: Toepfer International, 1986/87

Table 2.2. Area and Prodution of Wheat for France as a Percent of EC10, 1962 - 1985.

Year	Area	Production
	-------- Percent -------	
1962	38.1	40.5
1963	35.0	36.0
1964	37.4	41.0
1965	38.1	41.6
1966	36.0	36.9
1967	36.3	39.7
1968	36.0	40.8
1969	36.2	40.5
1970	34.2	37.1
1971	35.8	38.6
1972	32.9	41.7
1973	33.8	41.3
1974	34.1	40.3
1975	34.1	37.5
1976	35.3	38.9
1977	37.4	43.2
1978	34.7	43.7
1979	34.0	40.0
1980	36.3	43.0
1981	37.4	41.9
1982	37.2	42.3
1983	36.6	41.7
1984	37.6	43.4
1985	37.1	44.0
1986	36.6	.
1987	.	.

Source: World Wheat Statistics, various years, London.

TABLE 2.3 FRENCH REGIONS OF WHEAT PRODUCTION, 1986 AND 1987

Region	Production		Percent of French Wheat Production		Rank
	1986	1987	1986	1987	
	(MMT)				
Bordeaux	3.6	.43	1	1	15
Clermont-Ferrand	5.3	.73	2	2	14
Dijon	1.72	2.37	7	8	5
Lille	1.81	1.91	7	7	6
Amiens	3.34	3.45	13	12	2
Lyen	.55	.92	2	3	13
Marseille	.81	.10	3	--	--
Chalomo-Sur-Marne	2.65	2.72	10	9	3
Nancy	1.15	1.22	5	4	11
Rennes	1.06	1.21	4	4	12
Nantes	1.42	1.60	6	5	9
Orelans	4.06	5.04	16	17	1
Paris	1.61	1.86	6	6	7/8
Poitiers	1.51	1.62	6	6	7/8
Rouen	2.41	2.65	9	9	4
Toubuse	1.18	1.35	5	5	10
Montpellier	.05	.05	--	--	
TOTAL	25.50	29.30			

SOURCE: ONIC, Marche Des Cereales, July 1987.

Table 2.4. EC Wheat Supplies and Dissappearance for Crop Years 1961/62 - 1985/86 (MMT)*

	Supply				Disappearance			
Year	Beginning Stocks	Production	Imports	Total	Domestic	Exports	Total	End-of-Year Carryover
1961/62	6.5	23.1	6.6	36.2	26.7	3.2	29.9	6.3
1962/63	6.5	29.5	3.7	39.7	26.4	4.0	30.4	8.2
1963/64	8.2	24.6	4.1	36.9	26.9	3.8	30.7	6.1
1964/65	6.1	29.3	3.5	39.0	27.7	5.7	33.4	5.6
1965/66	5.6	30.5	4.2	40.3	27.7	5.8	33.6	6.8
1966/67	6.8	26.5	4.3	37.6	27.6	4.5	32.1	5.4
1967/68	5.4	31.3	3.6	40.4	28.0	4.8	32.8	7.6
1968/69	7.7	36.8	8.5	52.9	38.1	5.8	43.9	9.0
1969/70	9.0	35.7	8.4	53.2	40.4	7.3	47.7	5.5
1970/71	5.5	34.8	10.0	50.3	40.6	3.6	44.2	6.0
1971/72	6.0	40.1	6.8	52.9	40.1	5.3	45.4	7.4
1972/73	7.4	41.4	6.8	55.6	43.9	6.8	50.7	4.9
1973/74	4.9	41.3	5.5	51.7	40.4	5.4	45.8	5.9
1974/75	7.4	44.9	5.8	58.2	39.9	7.9	47.8	10.4
1975/76	10.4	37.7	7.1	55.2	37.5	9.5	47.0	8.3
1976/77	8.3	38.8	3.9	51.0	37.7	4.8	42.6	8.4
1977/78	8.4	38.1	5.5	52.0	39.2	5.6	44.8	7.2
1978/79	7.2	47.3	5.1	59.6	40.7	9.0	49.7	9.9
1979/80	9.9	46.3	4.8	61.0	41.8	10.9	52.7	8.2
1980/81	8.2	52.0	4.5	64.8	42.3	14.3	56.6	8.2
1981/82	9.2	54.2	5.0	68.5	45.4	15.8	61.2	7.3
1982/83	7.3	59.8	3.6	70.7	44.7	15.2	59.9	10.8
1983/84	10.8	59.1	3.1	73.0	48.1	16.4	64.4	8.6
1984/85	8.6	76.4	2.6	87.6	52.8	18.9	71.7	15.9
1985/86	15.9	65.9	2.6	84.4	53.9	15.9	69.8	14.6

*Six original member states to 1967/68, nine member states to 1980/81, thereafter ten member states.

Source: World Wheat Statistics, various years, London.

Table 2.5. Domestic Disappearance as a Percent of Total Disappearance

Year	EC10	US	Canada	Australia	Argentina
1961/62	89.4	45.8	28.4	29.8	56.3
1962/63	86.9	47.5	29.4	24.3	65.9
1963/64	87.6	40.7	20.9	23.4	51.8
1964/65	83.0	47.0	26.9	26.8	36.8
1965/66	82.6	45.7	21.2	34.7	40.1
1966/67	86.1	47.5	23.7	22.2	59.1
1967/68	85.3	45.4	31.7	32.1	65.5
1968/69	86.7	57.5	35.0	25.2	65.0
1969/70	84.7	56.0	22.6	22.7	64.6
1970/71	91.9	51.0	28.2	22.7	81.5
1971/72	88.4	57.5	25.9	26.5	75.2
1972/73	86.6	39.9	23.3	45.3	63.9
1973/74	88.3	39.5	28.7	29.9	72.1
1974/75	83.6	39.5	29.8	26.2	72.7
1975/76	79.8	38.1	26.0	25.0	64.5
1976/77	88.7	44.1	26.4	20.8	40.7
1977/78	87.5	43.3	23.8	24.5	73.4
1978/79	81.9	41.2	28.7	17.8	48.1
1979/80	79.3	36.3	25.7	20.3	45.7
1980/81	74.8	34.1	24.2	26.5	55.7
1981/82	74.2	32.4	22.0	18.1	56.3
1982/83	74.7	37.6	19.3	36.6	33.8
1983/84	74.6	43.7	20.3	15.4	38.4
1984/85	73.6	44.7	23.5	15.0	34.6
1985/86	77.3	34.4	24.4	16.0	50.0

Source: World Wheat Statistics, various years, London.

TABLE 2.6. SOURCES OF EC DOMESTIC DEMAND, 1975/77-[illegible]5 (MMT)

Year	Total Domestic Use	Animal Feed		Human Comsumption	
1976/77[1]	39.9	9.8	(25)[2]	27.6	(69)
1977/78	40.3	10.9	(27)	26.8	(67)
1978/79	42.7	11.9	(28)	27.8	(65)
1979/80	43.6	12.3	(28)	28.0	(64)
1980/81	44.1	13.1	(30)	27.7	(63)
1981/82	44.5	13.6	(31)	27.5	(62)
1982/83	44.7	14.9	(33)	26.2	(58)
1983/84	42.1	13.7	(33)	25.4	(60)
1984/85	43.6	14.3	(33)	26.1	(60)
1985/86	43.7	14.2	(32)	26.1	(60)

[1] EC-10.
[2] Percent shown in parentheses.

SOURCE: Eurostat.

Table 2.7. End-of-Year Carryover as a Percent of Production

Year	EC10	US	Canada	Australia	Argentina
1961/62	27.5	107.3	138.0	7.4	4.2
1962/63	27.7	109.5	86.2	7.5	8.8
1963/64	25.0	78.6	63.5	6.2	24.8
1964/65	19.1	63.7	85.4	6.6	29.7
1965/66	22.2	40.7	64.7	6.4	2.9
1966/67	20.5	32.5	69.1	17.3	10.0
1967/68	24.3	35.7	113.4	18.6	20.1
1968/69	24.6	52.5	131.1	49.0	9.3
1969/70	15.3	61.3	150.3	68.4	15.6
1970/71	17.3	54.1	221.4	43.1	29.5
1971/72	18.6	53.3	110.2	16.9	11.6
1972/73	11.8	28.3	68.5	7.3	3.8
1973/74	14.3	14.5	62.4	15.7	22.8
1974/75	23.2	18.2	60.4	14.6	19.7
1975/76	21.9	31.3	46.7	22.2	12.1
1976/77	21.7	51.9	56.5	18.1	20.2
1977/78	18.9	57.6	61.0	8.3	23.0
1978/79	20.8	52.0	70.5	25.7	19.9
1979/80	17.7	42.3	62.3	26.4	12.6
1980/81	15.8	41.5	44.4	18.8	11.6
1981/82	13.5	41.6	39.2	30.2	6.0
1982/83	18.1	54.8	37.3	25.9	4.6
1983/84	14.5	57.8	34.7	34.3	8.5
1984/85	20.8	54.9	35.2	47.0	3.4
1985/86	22.2	77.1	31.6	44.0	4.3

Source: World Wheat Statistics, various years, London.

Table 2.8. Area Planted by Major Exportors (in Million Hectares)

Year	EC10	France	Canada	US	Argentina	Australia
1962	12.0	4.6	10.9	17.6	3.4	6.7
1963	11.0	3.8	11.2	18.3	5.7	6.7
1964	11.7	4.4	12.0	20.1	6.1	7.3
1965	11.9	4.5	11.5	20.1	4.6	7.1
1966	11.1	4.0	12.0	20.2	5.2	8.4
1967	10.8	3.9	12.2	23.7	5.8	9.1
1968	11.4	4.1	11.9	22.4	5.8	10.8
1969	11.1	4.0	10.1	19.1	5.2	9.5
1970	10.9	3.7	5.1	17.6	3.7	6.5
1971	11.1	4.0	7.9	19.3	4.3	7.1
1972	12.0	3.9	8.6	19.1	5.0	7.6
1973	11.7	4.0	9.4	21.9	3.9	8.9
1974	12.2	4.1	8.9	26.5	4.2	8.3
1975	11.4	3.9	9.5	28.1	5.3	8.6
1976	12.1	4.3	11.3	28.7	6.4	9.0
1977	11.0	4.1	10.1	27.0	3.9	10.0
1978	12.0	4.2	10.6	22.9	4.7	10.2
1979	12.0	4.1	10.5	25.3	4.8	11.2
1980	12.6	4.6	11.1	28.8	5.0	11.3
1981	12.7	4.7	12.4	32.6	5.9	11.9
1982	13.0	4.8	12.6	31.5	7.3	11.5
1983	13.2	4.8	13.7	24.8	7.1	12.9
1984	13.6	5.1	13.2	27.1	5.9	12.0
1985	13.0	4.8	13.7	26.2	5.3	11.7
1986	12.7	4.7	14.2	24.6	5.1	11.3
1987	.	.	13.5	22.4	5.0	10.0

Source: World Wheat Statistics, various years, London.
Data for 1986 and 1987 from FAS and Toepfer.

Table 2.9. Area Planted by EC and US Total and Selected Classes (in Million Hectares)

Year	EC10	US Total	US HRW	US SRW
1978	12.0	22.9	14.8	2.5
1979	12.0	25.3	15.5	3.4
1980	12.6	28.8	16.5	4.7
1981	12.7	32.6	17.6	6.8
1982	13.0	31.5	17.5	7.0
1983	13.2	24.8	16.7	6.3
1984	13.6	27.1	17.6	5.9
1985	13.0	26.2	17.2	4.3
1986	12.7	24.6	15.9	4.1

Source: World Wheat Statistics, various years, London.
Wheat Situation and Outlook Report, ERS, WS-278, May 1987

TABLE 2.10 YIELDS AND PRODUCTION OF WHEAT BY TYPE IN FRANCE, 1978 - 87

	Yield (T/Ha)			Production (MMT)		
Year	Winter Soft Wheat	Spring Soft Wheat	Durum	Durum Soft Wheat	Spring Soft Wheat	Durum
1978	5.10	3.68	3.25	20.4	.25	.31
1979	4.85	4.37	3.42	17.9	1.26	.34
1980	5.23	4.08	3.69	22.9	.32	.43
1981	4.85	4.08	3.33	22.0	.28	.41
1982	5.30	4.27	3.22	24.6	.33	.37
1983	5.20	3.88	3.54	24.2	.21	.40
1984	6.53	5.06	4.42	32.2	.22	.58
1985	6.08	5.14	4.43	27.7	.32	.73
1986	5.56	3.98	3.87	25.3	.17	1.022
1987	6.23	--	4.65	28.6	--	1.42

SOURCE: Eurostat.

Table 2.11. Yield by Major Exporters (MT/ha)

Year	EC10	France	Canada	US	Argentina	Australia
1962	2.9	3.1	1.4	1.7	1.7	1.3
1963	2.6	2.7	1.8	1.7	1.6	1.3
1964	2.9	3.1	1.4	1.7	1.8	1.4
1965	3.0	3.3	1.5	1.8	1.3	1.0
1966	2.8	2.8	1.9	1.8	1.2	1.5
1967	3.3	3.6	1.3	1.7	1.3	0.8
1968	3.2	3.7	1.5	1.9	1.0	1.4
1969	3.2	3.6	1.8	2.1	1.3	1.1
1970	3.2	3.4	1.8	2.1	1.3	1.2
1971	3.6	3.9	1.8	2.3	1.3	1.2
1972	3.6	4.6	1.7	2.2	1.6	0.9
1973	3.7	4.5	1.7	2.1	1.7	1.3
1974	3.9	4.6	1.5	1.8	1.4	1.4
1975	3.5	3.9	1.8	2.1	1.6	1.4
1976	3.4	3.8	2.1	2.0	1.7	1.3
1977	3.7	4.2	2.0	2.1	1.4	0.9
1978	4.2	5.0	2.0	2.1	1.7	1.8
1979	4.1	4.8	1.6	2.3	1.7	1.4
1980	4.4	5.2	1.7	2.3	1.5	1.0
1981	4.3	4.8	2.0	2.3	1.4	1.4
1982	4.6	5.2	2.1	2.4	2.0	0.8
1983	4.5	5.1	1.9	2.6	1.8	1.7
1984	5.6	6.4	1.6	2.6	2.3	1.5
1985	5.0	6.0	1.7	2.5	1.6	1.4
1986	5.5	5.5	2.2	2.3	1.8	1.5
1987	.	.	1.8	2.6	1.9	1.4

Source: World Wheat Statistics, various years, London.
1986 and 1987 from FAS (FG-9-97).

Table 2.12. Yield by EC and US Total and Classes (MT/ha)

Year	EC10	US Total	 HRW	 SRW
1978	4.2	2.1	2.0	2.3
1979	4.1	2.3	2.3	2.7
1980	4.4	2.3	2.2	2.8
1981	4.3	2.3	2.0	3.0
1982	4.6	2.4	2.3	2.5
1983	4.5	2.6	2.7	2.6
1984	5.6	2.6	2.5	2.8
1985	5.0	2.5	2.4	2.7
1986	5.5	2.3	2.2	2.5

Source: World Wheat Statistics, various years, London.
Wheat Situation and Outlook Report, ERS, WS-278, May 1987

TABLE 2.13 GROWTH RATES IN YIELDS FOR MAJOR EXPORTERS

	Y	B	R^2	Growth Rate %/Year
EC-10	1.42 (120.33)	0.0114* (13.84)	.90	1.14
France	1.45 (88.46)	0.0133 (11.60)	.86	1.32
Canada	1.18* (56.24)	0.0043 (2.90)	.28	0.42
U.S.	1.22* (109.28)	0.0075* (9.54)	.81	0.75
Argentina	1.11* (37.05)	0.0055* (2.60)	.23	0.55
Australia	1.07* (25.97)	0.0019 (0.65)	.02	0.19
World	1.07* (131.56)	0.01146* (20.15)	.95	1.14

NOTE: Figures in ( ) are t-ratios and * indicates significantly different from zero at the 10 percent level.

Table 2.14. Total Wheat Exports by Major Exportors (MMT)

Year	EC*	US	Canada	Australia	Argentina	Total
1963/64	3.8	23.1	15.1	7.8	2.8	55.8
1964/65	5.4	19.6	11.9	6.5	4.4	50.5
1965/66	5.5	23.4	14.8	5.7	7.9	62.0
1966/67	4.2	20.0	14.8	7.0	3.1	55.8
1967/68	4.4	20.2	8.9	7.0	1.4	51.2
1968/69	5.0	14.7	8.7	5.4	2.8	45.7
1969/70	7.2	16.5	9.0	7.3	2.1	50.7
1970/71	3.1	19.8	11.6	9.5	1.7	54.3
1971/72	4.7	16.9	13.7	8.7	1.3	52.5
1972/73	6.5	32.0	15.6	5.6	3.5	68.3
1973/74	5.5	31.1	11.7	5.5	1.1	63.1
1974/75	7.1	28.3	11.2	8.0	2.2	63.4
1975/76	7.7	31.5	12.1	8.1	3.1	66.5
1976/77	3.9	26.4	12.9	8.4	5.6	61.8
1977/78	4.5	31.5	15.9	11.1	2.7	72.4
1978/79	7.4	32.4	13.5	7.2	3.3	71.7
1979/80	10.3	36.6	15.0	15.4	4.7	86.0
1980/81	12.7	42.1	17.0	11.1	3.9	94.0
1981/82	14.0	49.3	17.8	11.4	4.3	100.7
1982/83	14.1	39.3	21.1	8.5	7.5	96.1
1983/84	14.9	38.3	21.2	11.6	9.6	100.3
1984/85	17.2	38.2	19.1	15.1	8.0	104.1
1985/86	15.0	25.1	17.6	16.1	6.3	87.0
1986/87	15.0	27.3	20.8	14.9	4.3	90.1
1987/88**	16.0	33.3	21.0	13.0	5.0	95.8

*Six original member states to 1967/68, nine member states to 1980/81, ten member states to December 1985, thereafter 12 members.

**Preliminary

Source: World Wheat Statistics, various years, London;
1986/87 From FAS(FG-9-87)

Table 2.15. Total Wheat Exports by EC, Total US and Classes (MT)

Year	EC*	US Total	US HRW	US SRW
1963/64	3.8	23.1	13.6	2.2
1964/65	5.4	19.6	16.2	1.2
1965/66	5.5	23.4	10.2	1.8
1966/67	4.2	20.0	10.3	1.9
1967/68	4.4	20.2	10.2	3.2
1968/69	5.0	14.7	7.4	1.4
1969/70	7.2	16.5	9.2	0.8
1970/71	3.1	19.8	12.3	0.7
1971/72	4.7	16.9	9.2	1.2
1972/73	6.5	32.0	19.1	1.8
1973/74	5.5	31.1	19.9	0.7
1974/75	7.1	28.3	14.1	3.9
1975/76	7.7	31.5	15.8	4.5
1976/77	3.9	25.4	11.4	4.9
1977/78	4.5	31.5	14.6	5.4
1978/79	7.4	32.4	16.6	2.6
1979/80	10.3	35.6	19.7	4.2
1980/81	12.7	42.1	19.1	8.1
1981/82	14.0	49.3	20.5	12.5
1982/83	14.1	39.3	18.5	8.8
1983/84	14.9	38.3	19.2	6.0
1984/85	17.2	38.2	19.5	6.9
1985/86	15.0	25.1	11.2	4.2
1986/87	15.0	27.3	11.8	3.1
1987/88	16.0	38.3	17.0	4.4

*Six original member states to 1967/68, nine member states to 1980/81, ten member states to December 1985, thereafter 12 members.

Source: World Wheat Statistics, various years, London, IWC and Grain Market News and Wheat Situtation.

Table 2.16. Market Shares of Total Wheat Exports by Major Exportors

Year	EC*	US	Canada	Australia	Argentina
1963/64	6.8	41.4	27.1	14.0	5.0
1964/65	10.7	38.8	23.6	12.9	8.7
1965/66	8.9	37.7	23.9	9.2	12.7
1966/67	7.5	35.8	26.5	12.5	5.6
1967/68	8.6	39.5	17.4	13.7	2.7
1968/69	10.9	32.2	19.0	11.8	6.1
1969/70	14.2	32.5	17.8	14.4	4.1
1970/71	5.7	36.5	21.4	17.5	3.1
1971/72	9.0	32.2	26.1	16.6	2.5
1972/73	9.5	46.9	22.8	8.2	5.1
1973/74	8.7	49.3	18.5	8.7	1.7
1974/75	11.2	44.6	17.7	12.6	3.5
1975/76	11.6	47.4	18.2	12.2	4.7
1976/77	6.3	42.7	20.9	13.6	9.1
1977/78	6.2	43.5	22.0	15.3	3.7
1978/79	10.3	45.2	18.8	10.0	4.6
1979/80	12.0	42.6	17.4	17.9	5.5
1980/81	13.5	44.8	18.1	11.8	4.1
1981/82	13.9	49.0	17.7	11.3	4.3
1982/83	14.7	40.9	22.0	8.8	7.8
1983/84	14.9	38.2	21.1	11.6	9.6
1984/85	16.5	36.7	18.3	14.5	7.7
1985/86	17.2	28.9	20.2	18.5	7.2
1986/87	16.6	30.3	23.1	16.5	4.8
1987/88**	16.7	34.8	21.9	13.6	5.2

*Six original member states to 1967/68, nine member states to 1980/81, ten member states to December 1985, thereafter 12 members.

**Preliminary

Source: World Wheat Statistics, various years, London.
1986/87 From FAS(FG-9-87)

Table 2.17. Exports as Percent of Production for Major Exportors

Year	EC10	US	Canada	Australia	Argentina
1961/62	13.7	58.4	126.3	72.0	47.7
1962/63	13.5	58.8	58.6	74.5	32.6
1963/64	15.4	74.7	82.2	77.3	39.0
1964/65	19.4	56.5	66.6	72.4	56.9
1965/66	19.1	65.9	90.1	67.3	91.1
1966/67	16.9	57.0	62.3	67.1	35.2
1967/68	15.3	50.5	56.7	75.0	30.7
1968/69	15.8	35.0	47.1	45.2	43.1
1969/70	20.5	42.0	51.6	77.7	32.6
1970/71	10.3	54.6	131.3	114.7	17.2
1971/72	13.2	39.1	95.1	90.2	28.5
1972/73	16.4	76.6	108.1	62.8	39.2
1973/74	13.0	67.4	70.6	61.9	22.8
1974/75	17.5	57.9	81.0	75.3	28.7
1975/76	25.2	55.3	72.2	68.7	36.1
1976/77	12.4	44.4	57.0	82.7	53.0
1977/78	14.7	54.9	80.8	86.4	31.6
1978/79	19.0	67.2	61.9	64.6	49.3
1979/80	23.6	64.4	92.4	81.5	58.3
1980/81	27.4	63.6	84.3	88.6	45.0
1981/82	29.1	63.6	74.4	67.4	45.8
1982/83	25.4	54.6	79.9	82.5	65.3
1983/84	27.7	59.0	82.1	64.3	59.7
1984/85	24.7	54.9	82.7	80.2	68.4
1985/86	24.1	37.5	75.3	90.6	50.6

Source: World Wheat Statistics, various years, London.

Table 2.18. Exports of Wheat to Major EC Destinations (000 MT)

Country = ALGERIA

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	16	243	.	42	40	354
1970/71	6	318	.	333	.	663
1971/72	.	471	.	318	29	877
1972/73	16	408	.	212	.	633
1973/74	91	1,046	.	390	63	1,600
1974/75	363	717	.	613	103	1,924
1975/76	531	849	.	83	61	1,393
1976/77	81	356	.	423	211	1,258
1977/78	174	721	.	543	20	1,705
1978/79	134	487	.	346	.	1,006
1979/80	564	679	.	499	.	1,986
1980/81	329	504	.	750	.	1,824
1981/82	725	816	.	587	101	2,294
1982/83	678	610	.	483	.	2,008
1983/84	1,058	419	.	820	.	2,363
1984/85	1,129	539	.	472	.	2,164

Country = BANGLADESH

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	.	.	.	.
1970/71	.	.	.	.	.	.
1971/72	3	362	14	86	.	1,113
1972/73	157	743	53	224	555	1,734
1973/74	245	730	277	341	73	1,718
1974/75	632	790	299	332	18	2,121
1975/76	232	533	83	152	.	1,000
1976/77	230	376	109	90	.	805
1977/78	241	491	147	297	.	1,183
1978/79	197	552	52	365	.	1,221
1979/80	145	1,178	448	396	.	2,172
1980/81	191	210	109	136	.	659
1981/82	301	560	123	179	.	1,163
1982/83	368	718	49	428	.	1,364
1983/84	206	443	310	431	.	1,622
1984/85	239	1,376	262	36	7	2,189

Country = EGYPT

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	1,717	14	.	37	.	2,401
1970/71	857	16	1,273	441	.	3,013
1971/72	599	5	1,801	64	.	2,698
1972/73	1,643	283	729	30	.	3,048
1973/74	1,230	798	736	.	.	3,189
1974/75	1,601	730	848	.	13	3,294
1975/76	1,482	1,223	1,023	.	.	3,739
1976/77	686	2,059	1,034	211	64	4,109
1977/78	754	1,902	1,246	340	.	4,927
1978/79	1,313	1,967	1,233	134	.	5,541
1979/80	1,619	1,808	1,689	37	.	5,156
1980/81	2,362	2,331	1,846	12	.	6,733
1981/82	1,050	3,020	1,387	332	.	6,212
1982/83	1,063	3,120	1,819	22	24	6,188
1983/84	2,182	2,767	1,704	196	30	7,333

1984/85	1,628	2,433	2,208	461	.	6,519

Country = IRAQ

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	55	28	.	85
1970/71	.	8	436	322	.	828
1971/72	2	.	192	44	.	298
1972/73	.	.	.	.	.	.
1973/74	.	459	116	1	.	576
1974/75	1	.	255	183	.	439
1975/76	.	107	340	133	.	580
1976/77	.	58	529	200	92	969
1977/78	17	532	537	245	.	1,681
1978/79	.	488	481	3	.	1,467
1979/80	30	472	1.187	488	.	2.300
1980/81	40	138	575	467	94	1.366
1981/82	181	49	816	230	277	1,577
1982/83	205	925	403	310	50	1.900
1983/84	296	1.171	859	632	.	2.960
1984/85	189	868	1,216	567	.	2,836

Country = LIBYAN ARAB

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	183	.	.	.	.	215
1970/71	183	.	19	.	21	244
1971/72	187	4	16	.	20	260
1972/73	288	5	.	.	.	309
1973/74	224	15	.	.	24	285
1974/75	265	.	.	.	128	417
1975/76	329	.	.	.	109	438
1976/77	210	.	.	14	135	409
1977/78	152	39	.	.	39	330
1978/79	151	.	.	.	.	452
1979/80	286	.	.	14	.	424
1980/81	311	11	.	65	.	485
1981/82	271	.	.	258	.	529
1982/83	298	.	.	154	.	452
1983/84	389	32	.	112	51	585
1984/85	305	17	.	103	.	465

Country = MOROCCO

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	258	.	23	.	282
1970/71	.	599	.	20	.	620
1971/72	50	521	.	29	.	600
1972/73	52	335	.	21	.	538
1973/74	285	599	.	1	.	888
1974/75	373	456	.	17	90	987
1975/76	874	439	.	73	.	1.386
1976/77	105	370	.	24	385	924
1977/78	3	939	.	317	31	1,774
1978/79	897	224	.	20	39	1.422
1979/80	1.015	476	.	215	.	1.705
1980/81	1.363	695	.	12	.	2,076
1981/82	1.167	1.109	.	15	.	2.312
1982/83	312	1,067	.	.	.	1.388
1983/84	430	1,889	.	.	.	2.330

1984/85	910	1,798	8	.	.	2,718

Country = POLAND

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	60	10	.	71	.	1,195
1970/71	.	1	.	82	.	1,972
1971/72	378	.	.	49	.	1,553
1972/73	48	610	.	79	.	880
1973/74	34	509	.	109	.	1,758
1974/75	.	52	.	74	.	1,287
1975/76	138	717	.	350	.	1,892
1976/77	167	526	.	805	629	2,885
1977/78	.	775	.	702	.	2,470
1978/79	528	596	.	555	.	2,332
1979/80	1,143	870	102	1,518	.	3,827
1980/81	1,563	235	.	1,165	.	3,877
1981/82	1,659	136	.	1,511	.	3,817
1982/83	1,683	89	.	775	.	2,899
1983/84	898	97	.	75	206	2,025
1984/85	999	106	.	49	57	2,057

Country = SWITZERLAND

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	206	193	3	119	.	534
1970/71	73	191	31	106	.	404
1971/72	225	133	1	61	.	435
1972/73	229	151	1	76	.	457
1973/74	68	112	.	164	.	353
1974/75	160	66	.	94	.	390
1975/76	117	79	.	60	.	260
1976/77	68	137	10	103	31	355
1977/78	5	184	.	130	10	371
1978/79	128	68	.	48	.	307
1979/80	118	99	.	102	2	324
1980/81	210	88	.	47	.	345
1981/82	163	99	.	58	.	336
1982/83	80	120	.	151	.	360
1983/84	248	96	.	151	.	534
1984/85	88	99	.	50	.	250

Country = SYRIAN ARAB

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	40	.	.	79	.	145
1970/71	96	90	.	314	52	570
1971/72	153	232	.	217	.	632
1972/73	141	.	.	70	.	222
1973/74	128	.	12	70	.	210
1974/75	123	91	.	.	.	334
1975/76	131	67	.	.	.	198
1976/77	292	26	.	24	.	342
1977/78	175	.	.	352	.	563
1978/79	335	9	.	.	.	367
1979/80	455	48	.	20	.	529
1980/81	276	28	.	.	.	389
1981/82	167	.	.	.	.	591
1982/83	379	51	.	211	.	647
1983/84	263	2	25	157	79	569

1984/85	621	127	.	501	.	1,339

Country = TUNISIA

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	136	252	.	48	.	458
1970/71	91	204	.	57	.	392
1971/72	59	197	.	52	.	308
1972/73	112	72	.	39	.	233
1973/74	149	138	.	16	.	303
1974/75	82	177	.	11	24	320
1975/76	256	85	.	.	.	359
1976/77	77	136	.	47	231	516
1977/78	27	301	.	41	29	633
1978/79	205	170	.	73	21	627
1979/80	208	538	.	49	.	805
1980/81	279	221	.	23	.	584
1981/82	417	239	.	10	.	671
1982/83	297	235	.	.	7	645
1983/84	320	628	.	.	24	973
1984/85	238	574	.	14	.	846

Country = USSR

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	.	1,105	.	1,105
1970/71	.	.	.	315	.	315
1971/72	18	.	502	2,821	.	3,409
1972/73	704	9,468	908	4,168	.	15,899
1973/74	1	2,725	17	1,596	29	4,389
1974/75	.	978	656	313	680	2,828
1975/76	.	3,966	1,328	3,151	1,155	10,153
1976/77	.	2,869	368	1,183	139	4,559
1977/78	.	3,274	255	1,688	1,123	6,340
1978/79	5	2,967	136	1,892	.	5,024
1979/80	685	3,920	2,741	1,806	2,021	11,686
1980/81	717	3,000	2,465	4,464	2,975	14,911
1981/82	1,727	6,876	2,348	4,779	3,104	19,645
1982/83	3,396	3,036	1,004	6,953	4,218	20,140
1983/84	4,274	4,357	1,535	5,762	3,605	20,560
1984/85	6,078	6,123	2,040	7,633	4,057	28,156

Source: World Wheat Statistics, various years, London.

Table 2.19. Market Share of Wheat to Major EC Destinations

Country = ALGERIA

Year	EC	US	Australia	Canada	Argentina
1969/70	4.5	68.6	.	11.9	11.3
1970/71	0.9	47.8	.	50.1	.
1971/72	.	53.7	.	36.3	3.3
1972/73	2.4	62.3	.	32.4	.
1973/74	5.7	65.4	.	24.4	4.1
1974/75	18.9	37.3	.	31.9	5.4
1975/76	33.3	53.3	.	5.2	3.8
1976/77	6.4	28.3	.	33.6	16.8
1977/78	10.2	42.3	.	31.8	1.2
1978/79	13.3	48.4	.	34.4	.
1979/80	28.4	34.2	.	25.1	.
1980/81	16.0	27.6	.	41.1	.
1981/82	31.6	35.6	.	25.6	4.4
1982/83	33.8	30.4	.	24.1	.
1983/84	44.7	17.7	.	34.7	.
1984/85	52.2	24.9	.	21.8	.

Country = BANGLADESH

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	.	.	.
1970/71	.	.	.	.	.
1971/72	0.3	32.5	1.3	7.7	.
1972/73	9.1	43.0	3.1	12.9	32.0
1973/74	14.3	42.5	16.1	19.9	4.3
1974/75	29.8	37.2	14.1	15.7	0.8
1975/76	23.2	53.3	8.3	15.2	.
1976/77	28.6	46.7	13.5	11.2	.
1977/78	20.4	41.5	12.4	25.1	.
1978/79	16.1	45.2	4.3	29.9	.
1979/80	6.7	54.2	20.6	18.2	.
1980/81	29.0	31.9	16.5	20.6	.
1981/82	25.8	48.1	10.6	15.4	.
1982/83	23.5	45.9	3.1	27.4	.
1983/84	12.6	27.1	31.3	27.6	.
1984/85	10.9	72.0	12.0	2.6	0.3

Country = EGYPT

Year	EC	US	Australia	Canada	Argentina
1969/70	71.5	0.6	.	2.4	.
1970/71	28.4	0.5	42.3	14.6	.
1971/72	22.2	0.2	66.8	2.4	.
1972/73	53.9	9.3	23.9	1.0	.
1973/74	38.6	25.0	23.1	.	.
1974/75	47.2	22.1	25.0	.	0.4
1975/76	39.4	32.6	27.3	.	.
1976/77	16.7	50.1	25.2	5.1	1.6
1977/78	16.3	41.0	26.9	11.6	.
1978/79	27.3	35.5	22.6	2.8	.
1979/80	31.4	35.1	32.8	0.7	.
1980/81	35.0	37.5	27.3	0.2	.
1981/82	17.5	50.2	26.4	5.9	.
1982/83	17.2	50.4	29.4	0.4	0.4
1983/84	29.8	37.7	23.2	8.1	0.7

1984/85	23.9	36.0	32.4	6.8	.

Country = IRAQ

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	64.7	32.9	.
1970/71	.	1.0	52.7	38.9	.
1971/72	2.3	.	64.4	14.8	.
1972/73	.	.	.	.	.
1973/74	.	79.7	20.1	0.2	.
1974/75	0.2	.	58.1	41.7	.
1975/76	.	18.4	58.6	22.9	.
1976/77	.	6.0	54.6	20.6	9.5
1977/78	1.0	31.6	31.9	14.6	.
1978/79	.	33.3	32.8	0.2	.
1979/80	1.3	20.5	51.6	21.2	.
1980/81	2.9	10.1	42.1	34.2	6.9
1981/82	11.5	3.1	51.7	14.6	17.6
1982/83	10.8	48.7	21.2	16.3	2.6
1983/84	10.0	39.6	29.0	21.4	.
1984/85	6.7	30.6	42.9	12.9	.

Country = LIBYAN ARAB

Year	EC	US	Australia	Canada	Argentina
1969/70	85.1	.	.	.	.
1970/71	75.0	.	7.8	.	8.6
1971/72	71.9	1.5	6.2	.	7.7
1972/73	93.2	1.6	.	.	.
1973/74	78.6	5.3	.	.	8.4
1974/75	63.5	.	.	.	30.7
1975/76	75.1	.	.	.	24.9
1976/77	51.3	.	.	3.4	33.0
1977/78	46.1	11.8	.	.	11.8
1978/79	33.4	.	.	.	.
1979/80	67.5	.	.	3.3	.
1980/81	64.1	2.3	.	13.4	.
1981/82	51.2	.	.	48.8	.
1982/83	65.9	.	.	34.1	.
1983/84	66.5	5.5	.	19.1	8.7
1984/85	65.6	3.7	.	22.2	.

Country = MOROCCO

Year	EC	US	Australia	Canada	Argentina
1969/70	.	91.5	.	8.2	.
1970/71	.	96.6	.	3.2	.
1971/72	8.3	86.8	.	4.8	.
1972/73	9.7	62.3	.	3.9	.
1973/74	32.1	67.5	.	0.1	.
1974/75	37.8	46.2	.	1.7	9.1
1975/76	63.1	31.7	.	5.3	.
1976/77	11.4	40.0	.	2.6	41.7
1977/78	0.2	52.9	.	17.9	1.7
1978/79	63.1	15.8	.	1.4	2.7
1979/80	59.5	27.9	.	12.6	.
1980/81	65.7	33.5	.	0.6	.
1981/82	50.5	48.0	.	0.6	.
1982/83	22.5	76.9	.	.	.
1983/84	18.5	81.1	.	.	.

1984/85	33.5	66.2	0.3	.	.

Country = POLAND

Year	EC	US	Australia	Canada	Argentina
1969/70	5.0	0.8	.	5.9	.
1970/71	.	0.1	.	4.2	.
1971/72	24.3	.	.	3.2	.
1972/73	5.5	69.3	.	9.0	.
1973/74	1.9	29.0	.	6.2	.
1974/75	.	4.0	.	5.7	.
1975/76	7.3	37.9	.	18.5	.
1976/77	5.8	18.2	.	27.9	21.8
1977/78	.	31.4	.	28.4	.
1978/79	22.6	25.6	.	23.8	.
1979/80	29.9	22.7	2.7	39.7	.
1980/81	40.3	6.1	.	30.0	.
1981/82	43.5	3.6	.	39.6	.
1982/83	58.1	3.1	.	26.7	.
1983/84	44.3	4.8	.	3.7	10.2
1984/85	48.6	5.2	.	2.4	2.8

Country = SWITZERLAND

Year	EC	US	Australia	Canada	Argentina
1969/70	38.6	36.1	0.6	22.3	.
1970/71	18.1	47.3	7.7	26.2	.
1971/72	51.7	30.6	0.2	14.0	.
1972/73	50.1	33.0	0.2	16.6	.
1973/74	19.3	31.7	.	46.5	.
1974/75	41.0	16.9	.	24.1	.
1975/76	45.0	30.4	.	23.1	.
1976/77	19.2	38.6	2.8	29.0	8.7
1977/78	1.3	49.6	.	35.0	2.7
1978/79	41.7	22.1	.	15.6	.
1979/80	36.4	30.6	.	31.5	0.6
1980/81	60.9	25.5	.	13.6	.
1981/82	48.5	29.5	.	17.3	.
1982/83	22.2	33.3	.	41.9	.
1983/84	46.4	18.0	.	28.3	.
1984/85	35.2	39.6	.	20.0	.

Country = SYRIAN ARAB

Year	EC	US	Australia	Canada	Argentina
1969/70	27.6	.	.	54.5	.
1970/71	16.8	15.8	.	55.1	9.1
1971/72	24.2	36.7	.	34.3	.
1972/73	63.5	.	.	31.5	.
1973/74	61.0	.	5.7	33.3	.
1974/75	36.8	27.2	.	.	.
1975/76	66.2	33.8	.	.	.
1976/77	85.4	7.6	.	7.0	.
1977/78	31.1	.	.	62.5	.
1978/79	91.3	2.5	.	.	.
1979/80	86.0	9.1	.	3.8	.
1980/81	71.0	7.2	.	.	.
1981/82	28.3	.	.	.	.
1982/83	58.6	7.9	.	32.6	.
1983/84	46.2	0.4	4.4	27.6	13.9

1984/85	46.4	9.5	.	37.4	.

Country = TUNISIA

Year	EC	US	Australia	Canada	Argentina
1969/70	29.7	55.0	.	10.5	.
1970/71	23.2	52.0	.	14.5	.
1971/72	19.2	64.0	.	16.9	.
1972/73	48.1	30.9	.	16.7	.
1973/74	49.2	45.5	.	5.3	.
1974/75	25.6	55.3	.	3.4	7.5
1975/76	71.3	23.7	.	.	.
1976/77	14.9	26.4	.	9.1	44.8
1977/78	4.3	47.6	.	6.5	4.6
1978/79	32.7	27.1	.	11.6	3.3
1979/80	25.8	66.8	.	6.1	.
1980/81	47.8	37.8	.	3.9	.
1981/82	62.1	35.6	.	1.5	.
1982/83	46.0	36.4	.	.	1.1
1983/84	32.9	64.5	.	.	2.5
1984/85	28.1	67.8	.	1.7	.

Country = USSR

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	.	100.0	.
1970/71	.	.	.	100.0	.
1971/72	0.5	.	14.7	82.8	.
1972/73	4.4	59.6	5.7	26.2	.
1973/74	0.0	62.1	0.4	36.4	0.7
1974/75	.	34.6	23.2	11.1	24.0
1975/76	.	39.1	13.1	31.0	11.4
1976/77	.	62.9	8.1	25.9	3.0
1977/78	.	51.6	4.0	26.6	17.7
1978/79	0.1	59.1	2.7	37.7	.
1979/80	5.9	33.5	23.5	15.5	17.3
1980/81	4.8	20.1	16.5	29.9	20.0
1981/82	8.8	35.0	12.0	24.3	15.8
1982/83	16.9	15.1	5.0	34.5	20.9
1983/84	20.8	21.2	7.5	28.0	17.5
1984/85	21.6	21.7	7.2	27.1	14.4

Source: World Wheat Statistics, Various Years, London.

Table 2.20. Exports of Wheat to Major EC Destinations with Comparison to US HRW and SRW (000 MT)

Country = ALGERIA

Year	EC	US Total	US HRW	US SRW
1969/70	16	243	42	.
1970/71	6	318	132	.
1971/72	.	471	171	.
1972/73	16	408	92	.
1973/74	91	1,046	454	.
1974/75	363	717	157	16
1975/76	531	849	.	.
1976/77	81	356	13	.
1977/78	174	721	78	124
1978/79	134	487	.	28
1979/80	564	679	96	94
1980/81	329	504	157	44
1981/82	725	816	55	71
1982/83	678	610	.	.
1983/84	1,058	419	.	.
1984/85	1,129	539	.	27

Country = EGYPT

Year	EC	US Total	US HRW	US SRW
1969/70	1,717	14	.	.
1970/71	857	16	.	.
1971/72	599	5	.	.
1972/73	1,643	283	283	.
1973/74	1,230	798	683	.
1974/75	1,601	750	134	570
1975/76	1,482	1,225	.	1,022
1976/77	686	2,059	26	1,522
1977/78	754	1,902	133	1,336
1978/79	1,513	1,967	846	560
1979/80	1,619	1,808	375	664
1980/81	2,362	2,531	39	335
1981/82	1,050	3,020	5	.
1982/83	1,063	3,120	.	409
1983/84	2,182	2,767	.	557
1984/85	1,628	2,453	.	450

Country = MOROCCO

Year	EC	US Total	US HRW	US SRW
1969/70	.	258	190	.
1970/71	.	599	538	18
1971/72	50	521	257	209
1972/73	52	335	226	35
1973/74	285	599	455	4
1974/75	373	456	96	298
1975/76	874	439	185	88
1976/77	105	370	339	42
1977/78	3	939	242	607
1978/79	897	224	85	121
1979/80	1,015	476	60	309

1980/81	1,363	695	.	140
1981/82	1,167	1,109	9	1,084
1982/83	312	1,067	.	982
1983/84	430	1,889	.	1,509
1984/85	910	1,798	8	1,619

Country = POLAND

		US		
Year	EC	Total	HRW	SRW
1969/70	60	10	135	95
1970/71	.	1	711	274
1971/72	378	.	253	10
1972/73	48	610	155	.
1973/74	34	509	48	3
1974/75	.	52	95	4
1975/76	138	717	54	5
1976/77	167	526	.	.
1977/78	.	775	167	7
1978/79	528	596	139	.
1979/80	1,143	870	88	.
1980/81	1,563	235	23	.
1981/82	1,659	136	.	.
1982/83	1,683	89	.	.
1983/84	898	97	.	.
1984/85	999	106	.	.

Country = SYRIAN ARAB

		US		
Year	EC	Total	HRW	SRW
1969/70	40	.	.	.
1970/71	96	90	90	.
1971/72	153	232	.	42
1972/73	141	.	.	.
1973/74	128	.	.	.
1974/75	123	91	8	95
1975/76	131	67	76	.
1976/77	292	26	.	26
1977/78	175	.	.	.
1978/79	335	9	.	.
1979/80	455	48	26	23
1980/81	276	28	.	.
1981/82	167	.	.	.
1982/83	379	51	51	.
1983/84	263	2	.	.
1984/85	621	127	101	.

Country = USSR

		US		
Year	EC	Total	HRW	SRW
1969/70	.	.	.	.
1970/71	.	.	.	.
1971/72	18	.	.	.
1972/73	704	9,468	8,441	.
1973/74	1	2,725	2,722	[illegible]
1974/75	.	978	980	.
1975/76	.	3,966	3,859	.
1976/77	.	2,869	2,839	.

1977/78	.	3,274	3,387	26
1978/79	5	2,967	2,559	.
1979/80	683	3,920	4,094	.
1980/81	717	3,000	2,881	.
1981/82	1,727	6,876	6,285	.
1982/83	3,396	3,036	3,295	.
1983/84	4,274	4,357	4,048	.
1984/85	6,078	6,123	6,298	.

Source: World Wheat Statistics, various years, London, IWC and Grain Market News and Wheat Situtation.

Table 2.21. Market Share of Wheat to Major EC Destinations with Comparison to US HRW and SRW (000 MT)

Country = ALGERIA

		US		
Year	EC	Total	HRW	SRW
1969/70	4.5	68.6	11.8	.
1970/71	0.9	47.8	19.8	.
1971/72	.	53.7	19.5	.
1972/73	2.4	62.3	14.0	.
1973/74	5.7	65.4	28.4	.
1974/75	18.9	37.3	8.2	0.9
1975/76	33.3	53.3	.	.
1976/77	6.4	28.3	1.0	.
1977/78	10.2	42.3	4.6	7.3
1978/79	13.3	48.4	.	2.8
1979/80	28.4	34.2	4.8	4.7
1980/81	18.0	27.6	8.6	2.4
1981/82	31.6	35.6	2.4	3.1
1982/83	33.8	30.4	.	.
1983/84	44.7	17.7	.	.
1984/85	52.2	24.9	.	1.3

Country = EGYPT

		US		
Year	EC	Total	HRW	SRW
1969/70	71.5	0.6	.	.
1970/71	28.4	0.5	.	.
1971/72	22.2	0.2	.	.
1972/73	53.9	9.3	9.3	.
1973/74	38.6	25.0	21.4	.
1974/75	47.2	22.1	4.0	16.8
1975/76	39.4	32.6	.	27.2
1976/77	16.7	50.1	0.6	37.0
1977/78	16.3	41.0	2.9	28.8
1978/79	27.3	35.5	15.3	10.1
1979/80	31.4	35.1	7.3	12.9
1980/81	35.0	37.5	0.6	5.0
1981/82	17.5	50.2	0.1	.
1982/83	17.2	50.4	.	6.6
1983/84	29.8	37.7	.	7.6
1984/85	23.9	36.0	.	6.6

Country = MOROCCO

		US		
Year	EC	Total	HRW	SRW
1969/70	.	91.5	67.4	.
1970/71	.	96.6	86.7	2.8
1971/72	8.3	86.8	42.8	34.9
1972/73	9.7	62.3	42.0	6.5
1973/74	32.1	67.5	51.2	0.4
1974/75	37.8	46.2	9.7	30.2
1975/76	63.1	31.7	13.3	6.3
1976/77	11.4	40.0	36.6	4.5
1977/78	0.2	52.9	13.6	34.2
1978/79	63.1	15.8	6.0	8.5
1979/80	59.5	27.9	3.5	18.1

1980/81	65.7	33.5	.	6.8
1981/82	50.5	48.0	0.4	46.9
1982/83	22.5	76.9	.	70.8
1983/84	18.5	81.1	.	64.7
1984/85	33.5	66.2	0.3	59.6

Country = POLAND

		US		
Year	EC	Total	HRW	SRW
1969/70	5.0	0.8	11.3	7.9
1970/71	.	0.1	36.0	13.9
1971/72	24.3	.	16.3	0.6
1972/73	5.5	69.3	17.7	.
1973/74	1.9	29.0	2.8	0.2
1974/75	.	4.0	7.4	0.3
1975/76	7.3	37.9	2.9	0.3
1976/77	5.8	18.2	.	.
1977/78	.	31.4	6.8	0.3
1978/79	22.6	25.6	6.0	.
1979/80	29.9	22.7	2.3	.
1980/81	40.3	6.1	0.6	.
1981/82	43.5	3.6	.	.
1982/83	58.1	3.1	.	.
1983/84	44.3	4.8	.	.
1984/85	48.6	5.2	.	.

Country = SYRIAN ARAB

		US		
Year	EC	Total	HRW	SRW
1969/70	27.6	.	.	.
1970/71	16.8	15.8	15.8	.
1971/72	24.2	36.7	.	6.7
1972/73	63.5	.	.	.
1973/74	61.0	.	.	.
1974/75	36.8	27.2	2.5	28.5
1975/76	66.2	33.8	38.3	.
1976/77	85.4	7.6	.	7.7
1977/78	31.1	.	.	.
1978/79	91.3	2.5	.	.
1979/80	86.0	9.1	4.8	4.4
1980/81	71.0	7.2	.	.
1981/82	28.3	.	.	.
1982/83	58.6	7.9	7.9	.
1983/84	46.2	0.4	.	.
1984/85	46.4	9.5	7.6	.

Country = USSR

		US		
Year	EC	Total	HRW	SRW
1969/70	.	.	.	.
1970/71	.	.	.	.
1971/72	0.5	.	.	.
1972/73	4.4	59.6	53.1	.
1973/74	0.0	62.1	62.0	1.5
1974/75	.	34.6	34.7	.
1975/76	.	39.1	38.0	.
1976/77	.	62.9	57.9	.

1977/78	.	31.6	33.4	0.4
1978/79	0.1	39.1	30.9	.
1979/80	3.9	33.5	33.0	.
1980/81	4.8	20.1	19.3	.
1981/82	8.8	35.0	32.0	.
1982/83	16.9	15.1	16.4	.
1983/84	20.8	21.2	19.7	.
1984/85	21.6	21.7	22.4	.

Source: World Wheat Statistics, Various Years, London, IWC and Grain Market News and Wheat Situtation.

Table 2.22. Flour Exports as a Percent of Total Wheat and Flour Exports

Year	EC*	France	Canada	US
1963/64	37.1	18.1	9.9	11.1
1964/65	27.7	14.3	7.6	11.1
1965/66	26.0	15.2	6.7	11.1
1966/67	47.5	22.9	6.1	8.6
1967/68	30.8	14.7	7.1	9.3
1968/69	33.0	12.4	7.4	6.9
1969/70	24.3	13.6	8.6	11.2
1970/71	64.7	31.7	5.9	10.7
1971/72	52.2	17.9	5.0	7.1
1972/73	41.7	15.1	4.1	7.3
1973/74	47.0	14.9	4.2	3.7
1974/75	54.5	18.5	4.7	3.1
1975/76	37.6	15.7	4.7	2.8
1976/77	61.3	18.6	6.0	2.5
1977/78	69.1	20.9	4.8	6.2
1978/79	44.7	32.8	5.1	4.9
1979/80	40.2	27.2	4.6	4.5
1980/81	34.1	16.6	3.7	4.1
1981/82	31.3	15.1	3.0	4.1
1982/83	21.8	9.3	1.9	2.7
1983/84	26.1	13.4	3.4	4.6
1984/85	22.4	10.5	2.2	3.7
				3.2

*Six original member states to 1967/68, nine member states to 1980/81, thereafter ten member states.

Source: World Wheat Statistics, various years, London.

Table 2.23. Wheat Flour Exports by Destination and Total (000 MT)

Year	Country	North Africa	Sub Sahara Africa	Middle East	Latin America	USSR	Total
1973/74	EC10	684.2	362.1	400.3	132.5	0.0	2600.4
	US	90.9	40.2	187.9	153.8	0.0	934.1
	CANADA	1.4	52.0	10.5	51.8	301.0	471.0
	WORLD	776.5	476.2	613.0	363.4	301.0	4195.8
1974/75	EC10	1121.6	279.2	479.0	75.3	0.0	2465.2
	US	84.5	57.1	289.1	112.6	0.0	906.8
	CANADA	0.4	44.4	14.6	45.4	385.5	541.7
	WORLD	1206.5	408.9	734.0	257.3	385.5	4171.6
1975/76	EC10	1422.7	315.7	590.7	105.3	0.0	2926.2
	US	304.5	31.9	298.6	111.8	0.0	938.2
	CANADA	8.8	10.4	21.8	29.4	429.0	926.7
	WORLD	1736.0	381.1	911.3	269.7	429.0	5034.0
1976/77	EC10	915.2	377.0	684.6	102.8	0.0	2474.9
	US	613.7	35.1	285.6	102.1	0.0	1773.4
	CANADA	53.0	12.8	9.2	30.4	0.0	324.0
	WORLD	1581.9	455.3	979.7	258.8	95.0	4825.0
1977/78	EC10	961.3	649.7	678.8	93.4	0.0	3127.5
	US	474.7	81.2	305.3	126.6	0.0	1646.6
	CANADA	59.0	26.3	7.6	503.3	0.0	802.8
	WORLD	1495.0	789.6	980.5	746.6	0.0	5679.5
1978/79	EC10	1112.6	681.8	800.0	174.2	0.0	3352.4
	US	579.7	77.3	195.4	118.5	0.0	1491.7
	CANADA	65.3	16.2	28.5	560.4	0.0	837.4
	WORLD	1757.6	797.6	1026.8	879.4	0.0	5806.0
1979/80	EC10	1000.6	678.7	1361.7	107.4	123.3	4173.7
	US	601.3	111.8	287.4	93.8	0.0	1511.8
	CANADA	51.1	5.5	17.4	548.3	0.0	694.6
	WORLD	1653.1	816.0	1638.4	763.5	123.3	6447.6
1980/81	EC10	1895.0	760.4	617.1	115.1	702.7	4377.8
	US	734.8	255.1	218.0	99.0	0.0	1718.0
	CANADA	29.5	15.2	15.4	187.5	243.6	552.8
	WORLD	2659.4	1089.6	823.2	413.1	946.2	6756.6
1981/82	EC10	1388.6	1086.2	734.3	128.2	738.1	4433.6
	US	682.9	154.0	91.8	99.1	0.0	1367.3
	CANADA	40.7	50.0	19.5	371.0	30.2	550.6
	WORLD	2112.1	1352.0	664.2	610.6	768.3	6297.7
1982/83	EC10	1013.1	666.7	705.3	142.3	282.6	3064.1
	US	1190.6	151.1	111.7	89.0	0.0	1819.0
	CANADA	1.2	41.5	12.9	107.9	77.0	293.1
	WORLD	2204.8	888.4	624.7	350.7	359.6	5058.1
1983/84	EC10	1396.9	786.0	650.2	127.1	260.2	3402.6
	US	1457.0	159.1	166.2	139.8	0.0	2150.0
	CANADA	0.0	31.7	5.7	323.2	27.4	515.2
	WORLD	2853.9	997.0	559.2	599.9	287.6	5879.5

1984/85	EC10	1777.0	864.1	523.2	110.1	7.1	3330.8
	US	244.2	514.6	72.7	97.7	0.0	1133.6
	CANADA	21.7	97.3	10.9	190.0	21.5	420.8
	WORLD	2042.9	1509.0	611.5	410.8	28.6	4965.7
1985/86	EC10	1677.5	846.8	431.0	206.6	0.0	3[illegible]3.8
	US	651.7	460.0	65.8	93.6	0.0	1501.0
	CANADA	11.8	69.0	27.4	110.9	0.0	322.0
	WORLD	2341.0	1389.2	524.4	420.6	0.0	5146.4

Source: Grains, World Grain Situation and Outlook, FAS, December, 1986

Table 2.24. Market Share of World Wheat Flour Exports By Destination

Region = Latin America

YEAR	EC	US	CANADA
1973/74	36.5	42.3	14.3
1974/75	29.3	43.8	17.6
1975/76	39.0	41.5	10.9
1976/77	39.7	39.5	11.7
1977/78	12.5	17.0	67.4
1978/79	19.8	13.5	63.7
1979/80	14.1	12.3	71.8
1980/81	27.9	24.0	45.4
1981/82	21.0	16.2	60.8
1982/83	40.6	25.4	30.8
1983/84	21.2	23.3	53.9
1984/85	26.8	23.8	46.3
1985/86	49.1	22.3	26.4

Region = Middle East

YEAR	EC	US	CANADA
1973/74	65.3	30.7	1.7
1974/75	65.3	39.4	2.0
1975/76	64.8	32.8	2.4
1976/77	69.9	29.2	0.9
1977/78	69.2	31.1	0.8
1978/79	77.9	19.0	2.8
1979/80	83.1	17.5	1.1
1980/81	75.0	26.5	1.9
1981/82	86.8	10.9	2.3
1982/83	85.0	13.5	1.6
1983/84	79.1	20.2	0.7
1984/85	85.6	11.9	1.8
1985/86	82.2	12.5	5.2

1981/82 through 1983/84 was adjusted so Market Share did not exceed 100%

Region = North Africa

YEAR	EC	US	CANADA
1973/74	88.1	11.7	0.2
1974/75	93.0	7.0	0.0
1975/76	82.0	17.5	0.5
1976/77	57.9	38.8	3.4
1977/78	64.3	31.8	3.9
1978/79	63.3	33.0	3.7
1979/80	60.5	36.4	3.1
1980/81	71.3	27.6	1.1
1981/82	65.7	32.3	1.9
1982/83	45.9	54.0	0.1
1983/84	48.9	51.1	0.0
1984/85	87.0	12.0	1.1
1985/86	71.7	27.8	0.5

Region = Sub Saraha Africa

YEAR	EC	US	CANADA
1973/74	76.0	8.4	10.9
1974/75	68.3	14.0	10.9
1975/76	82.8	8.4	2.7

1976/77	82.8	7.7	2.8
1977/78	82.3	10.3	3.3
1978/79	85.5	9.7	2.0
1979/80	83.2	13.7	0.7
1980/81	69.8	23.4	1.4
1981/82	80.3	11.4	3.7
1982/83	75.0	17.0	4.7
1983/84	78.8	16.0	3.2
1984/85	57.3	34.1	6.4
1985/86	61.0	33.1	5.0

Region = USSR

YEAR	EC	US	CANADA
1973/74	0.0	0.0	100.0
1974/75	0.0	0.0	100.0
1975/76	0.0	0.0	100.0
1976/77	0.0	0.0	0.0
1977/78	.	.	.
1978/79	.	.	.
1979/80	100.0	0.0	0.0
1980/81	74.3	0.0	25.7
1981/82	96.1	0.0	3.9
1982/83	78.6	0.0	21.4
1983/84	90.5	0.0	9.5
1984/85	24.8	0.0	75.2
1985/86	.	.	.

Region = World

YEAR	EC	US	CANADA
1973/74	62.0	22.3	11.2
1974/75	59.1	21.7	13.0
1975/76	58.1	18.6	18.4
1976/77	51.3	36.8	6.7
1977/78	55.1	29.0	14.1
1978/79	57.7	25.7	14.4
1979/80	64.7	23.4	10.8
1980/81	64.8	25.4	8.2
1981/82	70.4	21.7	8.7
1982/83	60.6	36.0	5.8
1983/84	57.9	36.6	8.8
1984/85	67.1	22.8	8.5
1985/86	63.6	29.2	6.3

Source: Grains, World Grain Situation and Outlook, FAS, December, 1986

TABLE 2.25 WEIGHTED AVERAGE WHEAT CROP QUALITY IN FRANCE

	Protein	Zaleny	Hegberg	Ash	Alveograph	Farinograph Absorption
			Superior Wheat			
1976	13.2	34	331	1.68	198	63
1977	12.1	34	233	1.81	154	61
1978	10.9	29	262	1.73	123	63
1979	11.5	31	284	1.76	151	60
1980	11.1	33	266	1.70	155	61
1981	11.9	34	250	1.80	176	61
1982	12.0	33	277	1.69	162	62
1983	11.0	28	364	1.75	148	62
1984	11.9	31	284	1.67	155	65
1985	11.7	33	273	1.71	201	54
1986	13.4	40	231	1.69	217	55
Average	11.9	32.7	278	1.73	167	61
			Standard Wheat			
1976	13.6	27.4	345	1.69	165	
1977	12.8	27.7	243	1.87	131	
1978	11.3	23.3	271	1.77	104	
1979	12.0	21.5	297	1.78	124	
1980	11.4	23.4	271	--	--	
1981	12.1	22.4	257	--	128	
1982	12.1	19.6	302	--	124	
1983	11.4	16.1	354	--	117	
1984	11.8	19.4	286	--	114	
1985	11.8	20.6	320	1.66	155	
1986	13.5	28.5	303	1.66	190	
Average	12.2	22.7	295	1.75	135	
U.S. Comparisons[2]						
HRW[3]	11.9	50	388			62
SRW[4]	10.4	13	317			57.1

SOURCE: ITCF Annual Reports, 1976-86.

[1] Weighted by area planted across regions.
[2] U.S. wheat, 1986 Crop Report Quality.
[3] As in moisture basis.
[4] 1986 only.

TABLE 2.27 TRENDS* IN WEIGHT AVERAGE CROP QUALITY, 1976-1986

Quality Factor	Int.	Trend Coeff.[1]	R^2	F[2]
	Superior Wheat			
Protein	11.7 (21.3)*	0.03 (.33)	.01	.10
Zeleny	31.4 (14.9)	0.21 (.68)	.05	.45
Hagberg	283.5 (10.5)*	- .96 (.24)	.01	.06
Ash	1.76 (58.7)*	- .005 (1.18)	.13	1.4
Alveograph	146.4 (8.4)*	3.49 (1.37)	.17	1.88
Farin Abs.	64.1 (34.0)*	- .58 (2.08)*	.32	4.3*
	Standard Wheat			
Protein	12.3 (23.0)*	- .03 (.41)	.02	.17
Zeleny	25.4 (10.4)*	- .45 (1.2)	.14	1.5.
Alveograph	122.5 (6.7)*	2.08 (.80)	.07	.63
Ash	1.81 (40.6)*	- .01 (1.89)	.47	3.57
Alveograph	279.8 (12.1)*	2.61 (.77)	.06	.59

*Estimated from $X = \alpha + \beta$ trend where trend = 1, 2 . . . 11

[1] Value in ( ) is t-ratio and * indicates significantly different from 0 at the 10 percent level.

[2] F-test for overall significance, and * indicates significance at the 10 percent level.

TABLE 2.28. ANALYTICAL RESULTS OF FRENCH WHEAT AND CORN SAMPLES WITH COMPARISON TO U.S. FACTORS

Site	U.S. Grade and Factors								French Factors			
	Grade	Dockage	FM	DKT	Shrunken & Kernels	Defects	Moisture	TW	Misc. Impurities	Total Impurities	Sprout	Broken
		%	%	%	%	%	%		%	%	%	%
Sica, Rouen	1 SRW	.4	.1	1.0	.5	1.6	14.1		.3	1.1	.5	1.9
Sica, LaRochelle	1 SRW	.1	.0	.5	.2	.7	14.1		.1	.2	.5	3.4
Sica, LaRochelle	1 SRW	.1	.0	.0	.2	.2	14.1		.05	.15	.0	2.2
LaFrarcide, Blois	3 SRW	.2	.2	4.5	.3	5.0	11.6	61.5	.2	.6	4.5	1.9
Barett Farms, Authieux	1 SRW	.61	.11	1.4	.6	2.1	12.3	59.2	.3	.8	1.4	4.6
Coop Drecx, Loons[1]	2 SRW	.26	.1	3.5	.4	4.0	13.9		.1	.4	3.5	4.1
Benoist Orgerus	4 SRW	.0	.0	7.9	.0	7.9	13.35	60.4	.1	.1	7.9	.2
Average		.24	.07	6.9	1.2	3.07			.2	.5	2.6	2.6

[1] Composite of 13 farms

[2] Test weight was as 2 samples because of insufficient sample size.

APPENDIX B

FRENCH WHEAT QUALITY EVALUATION

United States
Department of
Agriculture

Agricultural
Research
Service

North Central Region
Soft Wheat Quality Laboratory
Ohio Agricultural Research &
Development Center
The Ohio State University
Wooster, Ohio

November 19, 1987

Dr. Michael J. Phillips, Senior Associate
O.T.A.
Food and Renewable Resources Division
Congress of the United States
Washington, D.C. 20510

Dear Michael:

Enclosed for your review are the results of the milling and baking quality evaluation of the seven French wheats from Mr. Roger Zortman.

As I indicated to you in conversation in Fargo, French wheats are historically neither extremely hard or extremely soft, as areU.S. hard and soft wheats, respectively. That historical assessment appears to be valid even on these samples. Note that we are initially comparing the 7 French wheats to our "standard"for this year, Caldwell, a reasonably soft and good milling U.S. eastern soft red winter wheat cultivar. In addition we are using Caldwell as our"benchmark" which is the standard which we use to compare between nurseries iresepective of where they are grown. In addition we included a hard red winter wheat cultivar, Bounty 203, for comparative purposes.

Note that the baking quality scores for the 7 French wheats vary from 6.9 to 55, all far below the 100 points for the standard Caldwell. That information indicates that the French wheats range from totally unacceptable to totally unacceptable to about the 3rd power! (I'm really not intending to be facetious: the French wheats are simply very coarse or hard compared to the extraordinary eastern U.S. soft wheats. Note also that lab numbers 810 and 811 have the lowest soft wheat baking scores,,even much lower that the Bounty 203 (the U.S. hard red winter cultivar). The other 5 French wheats have soft wheat quality baking scores which fall between the hard- and soft-standards, ranging from 48.6 to 55 points. Probably the French wheats are indeed intermediate quality somewhere between our good hard and good soft standards. However, using soft wheattests it is not possible to say with 100% assurance anything about how good the French wheats would be for hard wheat flour quality. We can only say with near absolute confidence that none of thw French wheats are even near acceptable as what we look for in our soft wheat flours.

I would be pleased to discuss some of the more specific implications of these tests and to discuss their limitations at any time. Please give me a call if I can be of help in any way.

Certainly we are happy to have the opportunity to be of assistance; in fact we welcome the opportunity to continue to be knowledgable about the changing (or non changing) quality of international wheats. As you collect others do not hesitate to call on us for further evaluations.

With best regards,

Patrick Finney

Patrick L. Finney, Research leader,
in charge

ADVANCED NURSERY EVALUATION

FOR SOFT WHEAT MILLING AND BAKING QUALITY

ROGER ZARTMAN

FRENCH WHEATS

STANDARD = CALDWELL BENCHMARK

LAB NO.	ENTRY	MILLING QUALITY SCORE		BAKING QUALITY SCORE		COMB. QUALITY SCORE		MICRO TEST WT. KG.HL	SOFTNESS EQUIV.	FLOUR YIELD	ASH	FLOUR PROTEIN	MICRO AWRC	COOKIE DIAMETER	TOP GRAIN
####	STANDARD	100	A	100	A	100	A	78.6	61.4	73.6	.35	7.9	52.9	18.2	7
####	BENCHMARK	100	A	100	A	100	A	78.6	61.4	73.6	.35	7.9	52.9	18.2	7
809 0551	1562	87.3	D	48.6	F	48.6	F	77 *	48.9*	72.7*	.37	9.3 *	58.3*	17.0*	7
810 0552	1557	83.3	E	14.5	F	14.5	F	79.3	44.8*	72.7*	.42*	9.3 *	65.3*	15.9*	7*
811 0553	1556	91.5	C	6.9	F	6.9	F	79.1	39.7*	74.9	.36	11.1*	70.3*	15.9*	7*
812 0554	1563	93.2	C	50.5	F	50.5	F	77.4*	49.2*	73.9	.35	9.3 *	59.7*	17.3*	7
813 0555	1553	88.3	D	50	F	50	F	77.5	49.4*	72.3*	.33	9.39*	59.4*	17.2*	7
814 0557	1561	87.2	D	52.5	F	52.5	F	76.9*	48.2*	72.4*	.34	9.5 *	57.8*	17.2*	7
815 0558	1555	93.5	C	55	F	55	F	79.1	49.5*	73.6	.34	8.89*	58.2*	17.2*	7
816 85402	BOUNTY 203 (HRW)	88.8	D	35.5	F	35.5	F	77.5	42.1*	75.3	.43*	10.5*	57.7*	16.7*	7*

DATA RANKED ACCORDING TO COMBINED QUALITY SCORE

ROGER ZARTMAN

FRENCH WHEATS

LAB NO.	ENTRY	MILLING QUALITY SCORE		BAKING QUALITY SCORE		COMB. QUALITY SCORE		MICRO TEST WT. KG/HL	SOFTNESS EQUIV.	FLOUR YIELD	ASH	FLOUR PROTEIN	MICRO AWRC	COOKIE DIAMETER	TOP GRAIN
****	BENCHMARK	100	A	100	A	100	A	78.6	61.4	73.6	.35	7.9	52.9	18.2	7
****	STANDARD	100	A	100	A	100	A	78.6	61.4	73.6	.35	7.9	52.9	18.2	7
815 0558	1555	93.5	C	55	F	55	F	79.1	49.5*	73.6	.34	8.89*	58.2*	17.2*	7
814 0557	1561	87.2	D	52.5	F	52.5	F	76.9*	48.2*	72.4*	.34	9.5 *	57.8*	17.2*	7
812 0554	1563	93.2	C	50.5	F	50.5	F	77.4*	49.2*	73.9	.35	9.3 *	59.7*	17.3*	7
813 0555	1553	88.3	D	50	F	50	F	77.5	49.4*	72.3*	.33	9.39*	59.4*	17.2*	7
809 0551	1562	87.3	D	48.6	F	48.6	F	77 *	48.9*	72.7*	.37	9.3 *	58.3*	17.0*	7
816 85402	BOUNTY 203 (HRW)	88.8	D	35.5	F	35.5	F	77.5	42.1*	75.3	.43*	10.5*	57.7*	16.7*	7*
810 0552	1557	83.3	E	14.5	F	14.5	F	79.3	44.8*	72.7*	.42*	9.3 *	65.3*	15.9*	7*
811 0553	1556	91.5	C	6.9	F	6.9	F	79.1	39.7*	74.9	.36	11.1*	70.3*	15.9*	7*

```
                        EVALUATION SUMMARY

                SUMMARY IS FOR ENTRIES  809  TO  816



                                                     NOTATION
                         AVERAGED                    BEGINS
                           DATA        LSD          *        0
MILLING QUALITY            89.1        ----        ----     ----
BAKING QUALITY             39.2        ----        ----     ----
COMBINED QUALITY           39.2        ----        ----     ----
MICRO TEST WEIGHT          78.0        1.18        77.4     76.2
SOFTNESS EQUIVALENT        46.5        3.3         58.1     54.8
FLOUR YIELD                73.5        0.8         72.8     72.0
FLOUR ASH                   .370       .040         .390     .430
FLOUR PROTEIN               9.7        0.64         8.5      9.2
MICRO A.W.R.C.             60.8        1.45        54.4     55.8
COOKIE DIAMETER            16.8        0.24        18.0     17.7
TOP GRAIN                   5.         2.40         4.6      2.2



ALLIS EQUIVALENTS
----- ----------

BREAK FLOUR YIELD          23.2        2.00        33.8     31.8
EXTRACTION                 75.6        0.89        74.8     73.92
E.S.I.                     11.7        0.98        12.5     13.47



COMBINED SCORES
-------- ------

A =   0 ENTRIES
B =   0 ENTRIES
C =   0 ENTRIES
D =   0 ENTRIES
E =   0 ENTRIES
F =   8 ENTRIES
        8 TOTAL ENTRIES
```

APPENDIX C

COMMERCIAL CONTRACTS
PARIS CONTRACTS
INTRA EC DNV NO. 7
ALGERIA TENDER

SYNDICAT DE PARIS DU COMMERCE ET DES INDUSTRIES DES GRAINS
PRODUITS DU SOL & DERIVES
61, Bourse de Commerce - 75040 PARIS CEDEX 01

Fr. L

Milling

==============================

ADDENDUM TECHNIQUE N° II
POUR LA VENTE DES SEIGLES Rye
ET DES BLES TENDRES DE MEUNERIE

Soft wht

==============================

PREAMBULE

Sauf conventions contraires pour les formules de Paris 13, 15, 18, 19, 20, 21, 22 et 23, ainsi que pour les RUFRA ; sur convention expresse pour les formules de Paris 12, 14, 16 la formule n° 1 du SYNACOMEX ou pour tout autre contrat-type de référence, les dispositions suivantes font partie intégrante des conditions de vente des seigles et des blés tendres de meunerie.

I - NORMES CONTRACTUELLES

Les normes techniques contractuelles de conditionnement physique et/ou de qualité technologique sont spécifiées par les parties sur convention privée.

1) Masses à l'hectolitre ou "Poids spécifique - P.S."

Il sera déterminé à la trémie conique ; toutefois, dans le cas où la constatation du poids spécifique ne pourrait être faite dans les conditions susvisées, des échantillons d'au moins un kilogramme seront prélevés contradictoirement et remis à la Chambre Arbitrale pour détermination du poids spécifique au Getreideprober 1938, 1 litre.

Lorsque le poids spécifique est garanti entre deux limites, aucune réfaction ne sera allouée s'il est constaté entre ces deux limites. S'il est constaté en-dessous de la limite inférieure, le calcul de la réfaction sera établi par rapport à la moyenne des deux limites.

La moins-value pour infériorité de poids spécifique sera supportée par le vendeur sur la quantité livrée en tenant compte proportionnellement des fractions, à raison de 1 % du prix facturé hors taxes par Kg/Hl manquant, à calculer à partir, et ce jusqu'à 2 Kgs de manquant. Au-delà, la marchandise est refusable.

Toutefois, si le manquant ne dépasse pas 500 grammes, la réfaction est ramenée à 1/2 % du prix, toujours au prorata.

2) Teneur en eau ou "humidité"

La teneur en eau est déterminée au moyen d'un humidimètre approuvé et poinçonné par la S.I.M. pour la commercialisation. En cas de contestation, la teneur en eau est mesurée au

.../...

Laboratoire par la méthode de référence pratique selon la norme française homologuée N F V 03. 707, dans son édition la plus récente.

- Si l'humidité de la marchandise dépasse la base convenue par contrat, la réfaction s'établira à raison de :
  - 1 % du prix du contrat pour le premier point (1 %) excédentaire et au prorata par dixième.

Si le contrat prévoit une humidité basée sur deux limites, la réfaction en cas de dépassement de la limite supérieure sera calculée à partir de la moyenne de ces deux limites.

Si le dépassement de l'humidité est supérieur à un pour cent, la marchandise est refusable.

3) Grains cassés/brisés Brokens

Dans le cas où le pourcentage des grains cassés/brisés dépasse celui garanti par le contrat, il sera alloué une réfaction de 1/4 % par point excédentaire jusqu'à 3 % fractionné proportionnellement. Au-delà de cette limite de 3 %, la réfaction sera fixée par arbitrage.

4) Grains germés Sprout

CAK
2% basis
+ 3%
5% allowed up to

Dans le cas où le pourcentage des grains germés dépasse celui garanti par le contrat, il sera alloué une réfaction de 1/2 % par point excédentaire jusqu'à 3 %, fraction au prorata. Au-delà de cette limite de 3 %, la marchandise est refusable.

5) Impuretés

discount
1/2 pct per 1 pct.

Les impuretés sont constituées par :

a) Les impuretés grains comprenant :

- les grains d'autres céréales et de plantes cultivées
- les grains attaqués par les déprédateurs
- les petits grains au-dessous de la grille de 2 mm pour wheat le blé ou de 1 mm 8 pour le seigle Rye (Grain impurities)
- les grains colorés (Colored)

b) Les impuretés diverses comprenant :

- les graines étrangères sauvages
- les grains chauffés et/ou moisis dans l'amande, les grains cariés, les grains fusariés roses au-dessus de la grille de 2 mm
- les débris au-dessous de la grille de 1 mm et toutes les matières inertes ou nuisibles, notamment l'ergot. ([illegible])

Les définitions des impuretés sont celles décrites dans les méthodes d'examen des céréales établies par le B.I.P.E.A. et publiées sous le code C R 46 M dans son édition la plus récente.

.../...

Pour le calcul des réfactions, le pourcentage des impuretés sera établi en comptant pour moitié de leur poids celles de la catégorie a) et pour leur intégralité celles de la catégorie b).

Le pourcentage, une fois déterminé, la réfaction s'établit à raison de 1 % par point jusqu'à un dépassement de 2 % au-delà de la tolérance prévue au contrat et 2 % par point pour les 3 et 4° pour cent excédentaires, fractions au prorata. Au-delà, la marchandise est refusable.

6) Temps de chute de Hagberg

En cas de vente comportant une garantie de temps de chute de Hagberg, la tolérance d'insuffisance éventuelle est fixée à 30" dont 15" en franchise et une réfaction d'un pour mille par seconde sur le prix net facturé au-delà de 15" et jusque 30". Au-dessous, la marchandise est refusable.

La garantie en temps de chute de Hagberg ne peut cumuler avec une garantie de grains germés laquelle, dans ce cas, devient nulle et non avenue.

7) Protéine

Le dosage de l'azote est effectué suivant méthode B.I.P.E.A. en utilisant un coefficient de 5,7.

En cas de vente comportant une garantie de protéine, l'insuffisance sera pénalisée à raison de 2 % du prix de facturation hors taxes et au prorata pour 0,5 % de manquant. Au-delà, la marchandise est refusable.

Toutefois, il y a franchise si le manquant ne dépasse pas 0,20 %

En conséquence, le barème est le suivant :

- insuffisance 0,10 % : pas de réfaction
- " 0,20 % : pas de réfaction
- " 0,30 % : réfaction de 1,20 % du prix
- " 0,40 % : réfaction de 1,60 % du prix
- " 0,50 % : réfaction de 2,00 % du prix

8) Test de Zélény

Le test de Zélény est effectué en appliquant la norme ISO 5529 dans son édition la plus récente. L'indice de sédimentation est exprimé à l'unité près.

En cas de vente comportant une garantie d'indice de sédimentation, l'insuffisance sera pénalisée selon le barème suivant, les réfactions s'appliquant au prix de facturation hors taxe :

.../...

Insuffisance 1 unité : pas de réfaction
2 unités : pas de réfaction
3 unités : réfaction de 1.20 %
4 unités : réfaction de 1.60 %
5 unités : réfaction de 2.00 %
6 unités et plus : lot refusable

II - BLES TENDRES VENDUS AVEC GARANTIE DE VARIETES

En cas de besoin ou à la simple demande de l'acheteur, les analyses de contrôle seront effectuées par le/s laboratoire/s désigné/s par les parties, choisi/s parmi ceux dont l'équipement, le personnel et le fonctionnement assurent régulièrement des résultats satisfaisants aux contrôles du B.I.P.E.A. Elles seront effectuées suivant la méthode de l'électrophorèse des gliadines et réalisées sur 50 grains, prélevés dans l'échantillon de laboratoire selon la méthode arrêtée par le B.I.P.E.A.

a) Variétés composantes nettement définies

Le pourcentage reconnu de grains appartenant à la variété ou aux variétés désignées doit correspondre au pourcentage garanti par le contrat.

Une insuffisance jusque 5 grains sur 50 est tolérée, gratuite pour les deux premiers et pénalisée de 1/2 du prix facturé, hors taxes, par grain pour les trois autres. Au-delà, la marchandise peut être refusée. Exemple : Une vente faite avec garantie de 80 % d'une ou plusieurs variétés doit, à l'analyse révéler 40 grains sur 50 de la ou des variétés contractuelles. Au-dessous, la livraison sera tolérée comme étant contractuelle avec 39 et 38 grains sans réfaction ; 37 grains avec réfaction de 1/2 % ; 36 grains avec réfaction de 1 % ; 35 grains avec réfaction de 1,50 %. En-deçà, la marchandise est refusable.

b) Variétés exclues

En cas de vente comportant des variétés exclues, la présence de trois grains sur 50 desdites variétés sera tolérée, dont deux grains en franchise ; le troisième grain étant pénalisé par une réfaction de 1/2 % du prix facturé, hors taxes. Au-delà, la marchandise est refusable.

En cas de vente comportant des variétés exclues avec néanmoins un pourcentage contractuel de tolérance, la marchandise pourra être refusée si le pourcentage contractuel est dépassé.

SUR L'ENSEMBLE DE TOUTES CES DISPOSITIONS (chapitres I, II) SI L'ACHETEUR PREND LIVRAISON D'UNE MARCHANDISE REFUSABLE, LA REFACTION FINALE SERA FIXEE PAR ARBITRAGE, FAUTE D'ACCORD AMIABLE.

.../...

III - DISPOSITIONS GENERALES

a) Echantillons

L'échantillon global, issu des prélèvements élémentaires, dont le nombre et les conditions d'exécution sont établies par le contrat de base, est soigneusement homogénéisé, puis divisé obligatoirement à l'aide d'un diviseur pour obtenir des jeux de chacun 3 échantillons de laboratoire représentatifs d'au moins 1 Kilo. Les échantillons seront cachetés.

b) Bulletin d'analyse variétale

Le bulletin d'analyse variétale portera le nombre de grains de chaque variété identifiée et le nombre de grains non identifiés, sur cinquante grains.

En annexe de chaque bulletin figureront des tableaux, pour des effectifs de 50, 100 ou 150 grains, donnant les intervalles de confiance des nombres de grains identifiés pour une probabilité de 95 %.

c) Analyses

Toutes analyses et contre-analyses nécessaires seront effectuées par les laboratoires désignés sur contrat privé par les parties contractantes et choisis sur une liste établie sur proposition du B.I.P.E.A. (Bureau Interprofessionnel d'Etudes Analytiques).

Si aucune désignation de laboratoire n'a été faite par les parties, toutes analyses et contre-analyse seront demandées à la Chambre Arbitrale de Paris.

Les frais d'analyse sont à la charge des acheteurs si les livraisons se révèlent conformes aux normes de base. En cas de livraisons sujettes à réclamations, les frais d'analyses seront à la charge des vendeurs.

Si l'acheteur a pris livraison d'une marchandise refusable, la réfaction sera fixée par arbitrage, faute d'arrangement amiable. Cette réfaction ne pourra être inférieure au maximum prévu par le barême pour le ou les motifs en cause, d'où la faculté pour l'acheteur de facturer ce minimum/maximum en règlement financier et final, sans arbitrage.

IV - LISTE DES LABORATOIRES AGREES A COMPTER DU 1ER AOUT 1986

A) Laboratoires reconnus aptes à déterminer la qualité Panifiable

I.A.N.E.S.C.O.
11 Rue Alcide d'Orbigny
17000 LA ROCHELLE

CREPIN ANALYSES ET CONTROLES
3 Rue de Buffon
76007 ROUEN

.../...

VEREIN
der
GETREIDEHÄNDLER
der
HAMBURGER
BÖRSE e.V.

1975. German-Dutch Contract No. 7

for grain shipments on inland-waterway and sea-going vessels within Europe, c.i.f. border passage, or arriving / delivery

prepared by
Verein der Getreidehändler der Hamburger Börse e. V.,
Koninklijke Vereniging Het Comité van Graanhandelaren, Rotterdam,
Vereniging Amsterdamse Graanhandel,
Synacomex, Paris.

(Legally binding shall be the original German text, but not this translation.)

Issued October 1, 1975

________________, ________________ 19____

Seller: ________________

Buyer: ________________

Intermediary: ________________

I (We) bought / sold today on the following conditions:

Quantity: ________ in words: ________________

tons of 1000 kilogrammes, in full shipments / part shipments, in bulk

Merchandise: ________________

Quality: a) fair average quality of shipments at the time and place of shipment,

b) about as per sample, marked ________________

sealed ________________ in the possession of ________________

____

c) ________________

with a natural weight of ________ kilos/hl, ________ % admixture, ________ % moisture, ________ % sprouted grains

border passage / arriving / delivery: ________________ (period)

to be shipped sound, merchantable from the country of origin

at the price of: ________ in words: ________________

for each 1000 kilos delivered, in bulk incl. freight and insurance to ________________

____

Payment: net cash against documents, which must be in order, (see § 11) in ________________

Arbitration: Verein der Getreidehändler der Hamburger Börse e. V., Börse, Kontor 24,
2000 Hamburg 11, Telephone: 36 21 52, Telex 02 13657 **NEUE TELEFO..-NR.: 36 20 25**

Remarks: ________________

The parties submit to the conditions pertaining to this contract and to the relevant sub-conditions and arbitration rules. All disputes relating to this contract and any further agreements connected with it are to be settled by the court of arbitration of the association agreed, and not only disputes between buyer and seller but also between the parties to the contract and intermediaries.

________________ ________________ ________________
Buyer Intermediary Seller

§ 1 Written Confirmations / Supplementary Agreements

(1) If contracts or letters of confirmation are being exchanged or given by a broker or agent, all previous agreements are cancelled if they have not been included in the contract or written confirmation. Contracts and written confirmations against which no immediate protest has been raised in writing, by telegram, or telex, are deemed approved.
(2) If later verbal agreements are made, they are valid only if at least one party confirms them immediately in writing or by telex. If no immediate protest is made against such communications in writing, by telegram, or telex, they are deemed approved.
(3) If letters of confirmation and contract(s) or several letters of confirmation are being given, the seller's letter of confirmation is to apply if it remains uncontested.

§ 2 Business Days, Periods

(1) Business days in the sense of this contract are all calendar days with the exception of Saturdays, Sundays, legal and recognized holidays, and the 24th and 31st December (non-business days).
(2) If the parties stipulate "first half of the month" or "second half of the month" as period of fulfilment of the contract, the 16th day of any month with an odd number of days is deemed to belong to either the first or the second half.

§ 3 Quantity Margins

(1) The seller has the right to ship 5 % more or less on an inland watercraft and 10 % more or less on a sea-going vessel. 2 % thereof are to be invoiced at the contract price, the remainder at the market price. The date to apply to the market price is the last day of discharge in the port of destination of the quantity concerned.
(2) In a border passage transaction, the bill of lading date applies to the market price.

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(3) If the contract is being fulfilled in part shipments during the agreed period of fulfilment, the seller's right to ship 5 resp. 10 % more or less applies only to the last part shipment within this period of fulfilment.

(4) If, at discharge, the quantity margin exceeds 6 resp. 11 %, the buyer has the option to demand the goods to be invoiced at the contract price or at the market price on the last day of discharge in the port of destination of the quantity concerned, and this is in either case to apply to the entire quantity margin including the permitted 6 resp. 11 %.

(5) The taking-up of documents must not be delayed because of disputes regarding the market price. The calculation appears in the final invoice.

§ 4 Shipment

(1) Shipment is to be on first-class seaworthy ships or motor sailing vessels, resp. in the case of transport on inland waterways, on good inland waterway craft, towed or push barges, direct or indirect.

(2) Each part shipment stands as a separate contract. If the quantity sold is 50 tons or less, the parcel must be loaded in one ship; if it exceeds 50 tons, the seller has the right to load the goods in one or more ships, but the quantities must not be less than 47,500 kilos each.

(3) If the goods are being sold as "afloat", the ship must have been cleared. If "loaded goods" are sold, they must be on board at the time of purchase. If the sale is of "goods being loaded", they must be in the process of being loaded at the time of purchase. A "ship being loaded" must have commenced loading.

§ 5 Destination

(1) If the port of destination has not been stipulated by the parties, the buyer has to declare the destination by telegram or telex, reaching the seller at the latest on the first business day of the month preceding the month of fulfilment. If the period of fulfilment is other than one calendar month, the afore-mentioned arrangement is to apply accordingly.

(2) If the declaration naming the destination has not reached the seller within the stipulated time, the seller may, after having given the buyer notice by telex or telegram, ship the goods to a destination within the range agreed in the contract.

§ 6 Period of Fulfilment

(1) In a "border passage" transaction, the seller has fulfilled the contract after completion of the customs formalities incumbent on him.

(2) If the goods have been sold "arriving" or "delivery", the seller has fulfilled the contract with the shipper's giving notice of readiness to discharge.

(3) If notice of readiness to discharge is being given before the period of fulfilment, the declaration is deemed to have been given for the first business day of the period of fulfilment. The seller has to bear any extra cost incurred through the premature declaration.

(4) The period of fulfilment ends with its last calendar day. If the period ends on a non-business day, preventing fulfilment, the last preceding business day is deemed the last day of fulfilment.

§ 7 Transhipment

(1) The seller has the right to have sea-borne goods transhipped if this is done by the vessel's owners on a through-bill of lading.

(2) In the case of inland water transport, transhipment with or without a through-bill of lading is permitted if the seller has informed the buyer of that intention latest with the appropriation, naming the transhipment port, and if the following conditions are adhered to: –

a) completion of transhipment within 5 business days after the arrival of the tendered vessel in the transhipment port;
b) supervision of the transhipment by an independent recognized organization (viz. warehouse, superintendence or transhipment company) and certification of the identity of the goods;
c) advice of dispatch on the connecting transfer ship after completion of transhipment by the seller in accordance with § 10;
d) invoicing on the basis of the weight loaded into the connecting vessel and presentation of documents for that ship if transhipment is not on a through-bill of lading;
e) seller bears the full transport risk for the goods to the transhipment port relating to any damage to the goods, average, and other cases of force majeure. He must inform the buyer of such an event immediately after it becomes known to him.

(3) Damaged or averaged goods may not be transhipped unless the buyer gives the seller express permission to do so. The contract is cancelled as far as the quantity is concerned which has not been transhipped because of damage, average, or force majeure without the parties having any claim against each other.

§ 8 Stowage Bags

If the goods are transported by sea, the seller has the right to load up to 15% in stowage bags in which case he will have to see to the cutting, emptying, and handling of the bags at discharge and bear the cost therefor. The bags remain the property of the seller.

§ 9 Combined Shipments

The seller has the right to load together goods of the same kind and quality, sold on the same quality terms on the basis of a German-Dutch Contract, even if they are destined to several ports, but the buyer must not be put to any disadvantage on account of this action.

§ 10 Appropriation

(1) Notice of completion of loading, stating the ship's name, the port of loading, the bill of lading date, and the approximate loaded weight must be given to the buyer by telegram or telex, within 2 business days after the bill of lading date if the goods are transported on inland waterways and within 1 business day after the bill of lading date in cases of shipment by sea.

(2) Sellers must forward the appropriation immediately by telegram or telex. Held equal to the appropriation by telegram or telex to the buyer shall be if that information is given by telegram or telex to the seller's agent and passed on by him immediately the same day by telegram or telex if received during the usual business hours.

(3) An appropriation cannot be withdrawn. The seller is not responsible for any mutilation of telegrams or telexes. The seller has the right to correct inaccuracies in appropriations except for the ship's name. The correction must have been made latest by the time the documents are being paid for.

(4) The seller does not have the right to give an appropriation for a ship which has become unseaworthy by average if he has knowledge of its unseaworthiness or if he could or should have obtained that knowledge.

§ 11 Documents / Payment

(1) The bill of lading or the loading note shall state if freight has been paid or is considered paid. The invoice amount is to be paid in exchange against documents, the freight to be deducted unless prepaid, the freight amount to be reduced by the customary advance payments, if any.

(2) The documents consists

a) aa) in the case of sea ships, of a complete set of clean "on-board" bills of lading, at least in duplicate, or delivery order(s) for such bills of lading made out by a reliable third party in rightful possession of the bills of lading;
    bb) in the case of inland waterway craft, of clean river bills of lading (i.e. connaissement fluvial) or ship's loading notes but not delivery orders;
b) insurance policy (policies) or certificate(s);
c) provisional invoices for the quantity loaded;
d) other documents if and as agreed.

(3) A copy of the charterparty is to be attached to the documents or a transcript of the charterparty conditions relevant to the buyer if reference to a charterparty is made in the bill of lading. In such a case, the buyer may, moreover, demand to see the charterparty.

(4) If bill-of-lading or charterparty conditions vary from those of the contract, the seller has to provide a suitable banker's or other adequate guarantee approved by the buyer. The same applies if an incomplete set of bills of lading is presented.

(5) On buyer's demand, the seller has to produce such other documents as are necessary for customs clearance and which can, in the circumstances, only be provided by the seller (certificate of origin etc.). Failure by the seller to provide such documents in time does not relieve the buyer of his obligation to pay as per (1).

(6) If the documents contain inaccuracies, the buyer is not entitled to refuse to accept them if a guarantee is provided by a first-class bank domiciled in the same country as the buyer.

(7) The documents have to be presented to the buyer at his place of business on a business day by 12 noon and, if in order, they have to be paid by 12 noon on the following business day. Payment for the documents is deemed made subject to fulfilment within the agreed period. Should the buyer refuse to accept the documents, he must state the reasons therefor immediately to the person presenting the documents.

(8) If the buyer is in arrears with payment, the contract conditions for default apply, but the seller, after declaring which of his rights he intends to exercise, must wait one business day before doing so. Within this time limit, the buyer may still pay but has to bear the cost incurred through the delay.

(9) The buyer has to receive the goods also if at arrival of the the ship the documents are not at hand. In such a case he has to give the guarantee demanded by the ship's owners; but the seller has to bear all extra costs incurred through the delayed presentation.

(10) By receiving the goods and giving such guarantee, the buyer does not lose any of his rights against the seller, ensuing from the documents.

§ 12 Insurance

(1) The seller has to insure the goods in the currency of the contract price at the customary F.P.A. conditions for sea voyages including war, mine, and torpedo risks, with recognized good insurance companies, for the solvency of which the seller is, however not responsible, at 3 % over the contract price. Any excess amount to be for seller's account in the case of total loss. Any insurance premium covering the risks of war, mines, and torpedoes exceeding one half per cent to be for account of the buyer.

(2) The insurance policy resp. certificate must state that the premium has been paid or is deemed to have been paid resp. that the insurer will pay compensation for damages also if the premium is unpaid. The insurance policies resp. certificates must also state that the insured amount incl. the imaginary profit will be paid in full in case of total loss.

§ 13 Average

Average is for seller's account (also if it concerns condition – § 19). In case of average, the buyer, for account of the seller, must take the necessary steps to claim against the insurer and/or those responsible for transport. He must, against payment of the inferior value laid down by arbitration and the advance payment, if any, towards general average, furnish the seller with the customary documents required by the average adjusters to prepare the average adjustment and/or with all documents which enable the seller to take recourse against the ship owners. He must return to the seller also the policy (policies) or insurance certificates which he has taken out to increase the insured amount. If the policies or certificates cannot be produced, the buyer has to pay that part of the average amount which the seller cannot recover because of the absence of these documents, but after the average adjustment, the seller must refund the buyer the portion allotted in the average adjustment to the policies or insurance certificates which the buyer has taken out to increase he insured amount.

§ 14 Export/Import Permits

The seller is responsible for the furnishing in time and for the validity of any required export licences and the buyer for the furnishing in time and for the validity of any required import licences and foreign exchange permits. Should such permits, after being given to the parties, be withdrawn, the party responsible for obtaining them remains also responsible therefor, unless the withdrawal is due to a general export resp. import prohibition.

§ 15 Force Majeure

(1) Should the fulfilment be rendered impossible by prohibition of exports or imports, blockade, hostilities, or other cases of force majeure, this contract or any unfulfilled portion thereof will be cancelled. Should the seller have recourse to such an obstruction to loading, he has to inform the buyer by telex or telegram immediately after the event has come to pass.

(2) If fulfilment is rendered impossible for a time by riot, strike, lockout, or other temporary circumstances beyond the seller's responsibility, the period of fulfilment is extended by the duration of the obstruction. The same applies in the case of unusual water conditions or ice obstruction on the waterways and in the port of destination. Should the obstruction last longer than 28 consecutive days, the contract will be cancelled without mutual allowances. If the seller claims a case of impediment to fulfilment, he has to inform the buyer at the latest two business days after the period of fulfilment has expired.

If the contract states several periods of fulfilment, the afore-going stipulations apply only to the period directly affected by the impediment or obstruction.

On buyer's demand, the seller has to prove the existence of the impediment or obstruction to fulfilment.

§ 16 Extension

If the contract is not fulfilled within the agreed period, that period shall be extended by up to 6 consecutive days without any special notice being required from the seller. The seller has to pay the buyer an allowance of ¾ % if the fulfilment period is exceeded by up to 4 days and an allowance of 1¼ % if the fulfilment period is exceeded by 5 or 6 days. In the invoice, the allowance must be deducted from the contract price resp. it must be stated at the latest in the final invoice. In case of non-fulfilment, the calculation of the price difference has to be based on he contract price less 1¼ %.

§ 17 Discharge

(1) The goods have to be discharged during the working hours customary in the port of arrival and in accordance with the custom of the port. If the documents contain contrary stipulations, the seller will be responsible for all extra expenses incurred thereby (see also § 11 Payment). The cost of discharge is for buyer's account, in the case of sea traffic ex the ship's rail and in the case of inland navigation ex the ship's holds.

(2) The buyer has to see to the goods being properly weighed at discharge and to obtaining free of cost an official certificate or the certificate of a sworn weigher unless the weights have been mutually ascertained.

(3) Lighterage and demurrage resulting from the vessel being prevented to reach the port of destination are at the expense of the seller and, in the event, are to be allowed for in the final invoice. In inland navigation, the seller decides about lightering.

§ 18 Pro Rata

(1) Collected residue, damaged goods, sweepings, and the excess or deficiency delivered by the ship over or below the invoiced quantity are to be shared by and apportioned pro rata between the various receivers in the port of discharge named in the contract, namely collected residue, damaged goods, and sweepings in kind, the quantity excess or deficiency by settlement. If a receiver receives more or less than his pro-rata share or pro-rata apportioning, he has to settle in cash with the other receiver or receivers at the current price ruling on the last day of discharge of the ship in the port of destination of the quantity concerned. The current price is, if necessary, to be fixed by arbitration. All sellers and buyers, who have shipped or have to receive a part of a larger quantity according to a contract containing this clause, submit to the afore-mentioned procedure and undertake to have settled by the court of arbitration named in this contract any disputes arising amongst them from such pro-rata apportionings and to give the necessary assistance in ascertaining the pro rata. The sellers are responsible for the settlement of the pro rata by their buyers within a reasonable time.

(2) The apportioning and pro-rata settlement in Amsterdam and Rotterdam, moreover, conform with the "Reglement Verdelingen van de Vereniging voor de Beslechting van Geschillen bij de Graanexpeditie", Rotterdam.

(3) Any allowances for condition, quality, natural weight, analysis variation are to be paid on the quantity actually received and not on the pro-rata weight.

§ 19 Condition

(1) The goods are to be delivered in sound condition.

(2) The buyer has to accept any damaged or unsound goods with an allowance to be fixed, if necessary, by arbitration.

(3) A normal, natural, characteristic smell and slight dry warmth, which has not injured the goods, is not to be objected to.

§ 20 Quality

(1) Unless otherwise agreed, the delivery has to be of fair average quality of the shipments at the time and place of loading. The place of loading under this contract is to be the country of origin as agreed resp. the region adopted by the standards commission of the competent court of arbitration in making the respective standard. Any variations from fair average quality claimed by the buyer

are to be determined by the competent court of arbitration on the basis of and in comparison with the official standard sample for the place and time of shipment as established by the competent court of arbitration.
(2) Separate standards are to be made for maize discharged by suction elevator and for maize discharged by grabs or other means
(3) If a standard sample has not been made, the court of arbitration has to decide by its own expertise whether or not the delivered goods are of fair average quality.

§ 21 Sampling
Sampling at discharge is according to the Sampling Rules published in connection with the German-Dutch Contract No. 8.

§ 22 Natural Weight Ascertainment
[illegible] the natural weight is established by the authority competent and accepted by the trade in the port of destination on a gauged [illegible] within 5 business days after receipt of the samples by that authority.
[illegible] scale does not exist at the port of destination, the samples are to be weighed on the gauged one-litre scale of the [illegible] authority accepted by the trade for ascertaining natural weights.
[illegible] weighings have taken place, the average natural weight is to be ascertained under consideration of the quantities. The [illegible] to goods of the same kind and quality which have been shipped in one vessel on several bills of lading and delivered [illegible] the buyer.
[illegible] parties have the right to be represented when the natural weight is being ascertained.
[illegible] the goods used to ascertain the natural weight belong to the authority entrusted with that procedure.
The natural weight is being calculated on the basis of the weights ascertained on the 20-litre or 1-litre scale in accordance with the regulations valid or customary in the particular port. Each party bears 50 % of the cost of ascertaining the natural weight.

§ 23 [illegible] for Natural Weight Deficiencies
[illegible] of 1 % at delivery is permitted for shrinkage during transport if the sale has been of goods with a stated natural [illegible] agreed natural weight is within two limits (i.e. 77/78 kilos), the mean of the two is taken as the basis.
[illegible] natural weight properly ascertained on the appropriate 20-litre resp. 1-litre scale is final. Allowances for lower natural weight [illegible] e, barley, and oats delivered sound are as follows:
[illegible] off the contract price for the first and second kilo/hl deficiency each and
[illegible] off the contract price for the third kilo/hl deficiency.
[illegible] delivery of feed barley has been expressly agreed between the parties, the allowances on the goods delivered sound are [illegible] off the contract price for each the first, second, and third kilo/hl deficiency.
(4) Fractions are to be allowed for in proportion.
(5) The court of arbitration has to decide the inferior value if the deficiency is greater.
(6) If the court of arbitration has to decide the inferior value of the goods according to § 19, is must, on application of one party, declare at the same time whether an allowance for natural weight deficiency is contained therein or whether it has to be paid separately

§ 24 Analysis
(1) The application to analyse for admixture and/or moisture and/or sprouted grains and/or other contractually agreed quality characteristics, which are customarily ascertained by analysis, has to be despatched by the buyer to the analyst within 10 business days after the discharge of the ship in the port of destination of the quantity concerned. Unless something different has been agreed by the parties, the analysis is to be carried out by the recognized analysts domiciled at the same place as the court of arbitration.
(2) For goods of the same kind and quality, which the seller has shipped in the same ship from the same port of loading to one buyer, an average of the analysis results will be ascertained taking into account the quantities represented, also if the goods are shipped on several bills of lading.
(3) Half the cost of the analysis shall be borne by each party. In other respects, the sampling and analysis rules pertaining to this contract apply.

§ 25 Second Analysis
(1) A second analysis for moisture and sprouted grains is inadmissible.
(2) If a second analysis is demanded for admixture or other contractually agreed content values customarily ascertained by analysis, notice to the other party and the application for a second analysis to the respective analyst have to be despatched within 5 business days from the receipt of the analysis certificate. Resellers must forward the notice without delay. The time allowed is being extended accordingly.
(3) If the contract does not state the analyst to carry out the second analysis and if the parties do not agree another analyst, the second analysis is to be carried out by the same analyst as the first one.
(4) The result of the first analysis remains valid if the second analysis result does not vary from it by more than ½ %. If the variation exceeds ½ %, the mean of the two analysis results applies no matter which party applied for the second analysis.
(5) The cost of the second analysis is to be borne by the applicant unless both parties have applied for the second analysis. In such a case, each party has to bear 50 % of the cost.

§ 26 Admixture
(1) If foreign substances (admixture not including other grains) exceed the contractual basis when the sale has been of wheat or milling rye, the allowance off the contract price shall be 1 % each for the first and second per cent excess admixture and 2 % each for the third and fourth per cent admixture.
(2) If foreign substances exceed the contractual basis when the sale has been of feed wheat, feed rye, barley, oats, maize, or sorghum, the allowance off the contract price is 1 % each for the first, second, and third per cent excess admixture and 2 % each for the fourth and fifth per cent excess admixture.
(3) If the rye admixture exceeds the contractual basis when the sale has been of wheat, the allowance off the contract price is ½ % each for the first, second, and third per cent excess admixture. Grain admixture other than rye when wheat has been sold, will be allowed for at the same rate as foreign substances.
(4) Unless otherwise agreed between the parties, a wheat admixture of up to 5 % is admissible without allowance if milling rye has been sold. Grain admixture other than wheat will in such a case be allowed for at the same rate as foreign substances.
[illegible]
with the higher value (other grain). Fractions are to be taken into account.
(6) If the admixture exceeds the above-mentioned allowance scales, the court of arbitration has to decide over the claims for inferior value

§ 27 Moisture
(1) Exceeding the contractual moisture content by up to ¼ per cent is permitted without any allowance. The allowance for a higher moisture content is to be based on the contractual maximum.
(2) If a moisture content margin (i.e. 16–17 %) has been agreed, the seller, with the preceding paragraph set aside, has fulfilled the contract if he has delivered goods with the agreed maximum content. If the maximum limit has been exceeded, the mean of the two figures is to form the basis for any settlement.
(3) If the moisture content of the goods exceeds the contractual basis, the allowance is to be 1 % off the contract price for the first per cent excess moisture and 1,5 % off the contract price for the second per cent excess moisture.
(4) Fractions are to be allowed for in proportion.
(5) If the moisture content exceeds the contractual basis by more than 2 %, the court of arbitration has to decide over any claims for inferior value

§ 28 Claims and Procedure for Claiming Arbitration

(1) The buyer has to notify the seller in writing, by telex or telegraph within seven business days after completion of discharge of the ship in the port of destination of the quantity concerned of any claim for inferior condition and/or quality of the goods naming [illegible] arbitrator and stating the reasons. Resellers are to forward the notice without delay. The seller has the right to reject buyer's claim for inferior value if and inasmuch as the claim is made out of time.

(2) [illegible] an award is to be made to the court of arbitration;

a) [illegible] from fair average quality, within 14 business days after the publication that the standard has been or will not be made;

b) [illegible] from the sales sample, within 14 business days after completion of discharge of the ship in the port of destination of [illegible] concerned;

c) for deviation from other quality stipulations than under a) and b), within 14 business days after completion of discharge of the ship in the port of destination of the quantity concerned;

d) for divergent condition of the goods, within 7 business days after completion of discharge of the ship in the port of destination of the quantity concerned.

(3) Claims for inferior value because of lower natural weight and divergent analysis results are not affected by the above time limits [illegible] and applications for an award, even if the allowances are to be fixed by the court of arbitration because of their extent. [illegible] been of goods of fair average quality and if the difference between the delivery on the one side and the standard [illegible] weight allowance on the other is less than ½ % of the contract price, no quality allowance [illegible] to be paid. Otherwise [illegible] a claim of being paid the full difference in value.

(4) [illegible] condition of the goods does not give the buyer the right to refuse to accept them. Inferior quality of the goods does not give the buyer the right to refuse to accept them unless the court of arbitration has declared such refusal justified because of the deviation from fair average quality respectively from the sales sample plus natural weight and analysis allowances being 10 % or more of the contract price.

(5) A [illegible] condition for the acknowledgement of the right to return the goods is that they are still in an unchanged condition in the port of discharge. If the court of arbitration acknowledges the right to return them, the seller has to refund the invoice amount plus interest, freight, and costs against a delivery note. In that case, the buyer has, moreover, a claim for damages because of non-fulfilment [illegible] price difference on the last day of discharge of the ship in the port of destination of the quantity concerned.

§ 29 Final Invoice

Final [illegible] are to be paid within 14 consecutive days after their receipt.

§ 30 Default

(1) In case of default, the non-defaulter has the right

a) [illegible] draw from the contract;

b) [illegible] goods or the documents within 3 business days privately or publicly for account of the defaulter respectively to buy a [illegible] quantity [illegible] to demand from the defaulter immediate payment of the price difference resulting [illegible] the debit of the defaulter. [illegible] VEREIN DER GETREIDEHANDLER DER HAMBURGER BORSE E. V. has been agreed, the cover[illegible] purchase [illegible] accordance with the "Directives of the Council of the VEREIN DER GETREIDEHÄNDLER DER HAMBURGER [illegible] Regarding Covering Transactions and Price-Fixing Within the Jurisdiction of the Verein".

c) [illegible] value of the goods ascertained by the court of arbitration and to demand from the defaulter immediate payment of the [illegible] difference resulting to the debit of the defaulter.

(2) The non-defaulter has to inform the defaulting party without delay which right he intends to exercise. Failing this or if he has declared [illegible] to make a covering purchase or sale but has not done so or has not been able to do so, he still [illegible] the [illegible]. The same applies if the covering transaction has not been carried out in the proper manner [illegible] has lead [illegible] result [illegible] opinion of the court of arbitration, does not conform to market conditions.

§ 31 Circle Clause

(1) If a seller has rebought from his buyer or from a subsequent buyer the same goods or a portion thereof [illegible] have been [illegible] the settlement has to be on the appropriated quantity by the buyer paying the seller the [illegible] invoice [illegible] the contract concerned and the lowest invoice amount in the circle. Circle invo[illegible] business [illegible]

[illegible] rules apply accordingly when no appropriation has been made. Every seller [illegible] pos- [illegible] establishing the circle. A circle having been established and being obliga[illegible] buyer [illegible] paying his particular amount resulting from the circle settlement.

[illegible] ement does not take place if delivery is rendered impossible as per § 15 and if the [illegible] claim to invoke the [illegible]

[illegible] the circle suspends payments or if facts exist which ar regarded equal to a suspens[illegible] payments, instead of [illegible] ement on the lowest invoice amount, it has to be based on the current price ruling on the [illegible] business day after the [illegible] payments or of facts regarded equal to a suspension of payments have become kno[illegible] price is, if neces- [illegible] ertained by an expert to be nominated by the chairman of the agreed court of arbitra[illegible] of his represen- [illegible] resulting differences are to be mutually settled by the parties to the contract concerned.

[illegible] on of Payments

[illegible] suspends payments or if facts exist which are regarded equal to a suspensio[illegible] of payments or other facts regarded equal to a suspe[illegible] cause the transactions to be wound up by purchase respectively [illegible] failing which both parties have the right to have the value of the goods [illegible] by an expert [illegible] court of arbitration agreed or by one of his representatives. Settling day for the price-fixing is the first business [illegible] of facts regarded equal to a suspension of payments has become known. [illegible] difference to be settled between the parties. The costs are for account of the party who has [illegible] of the contract is inadmissible in the case of suspension of payments.

§ [illegible]

[illegible] on a business day after 1600 hours, are deemed to have been [illegible] less [illegible] communications without delay.

§ 34 Commission

The seller has to pay the intermediary the agreed commission, no matter whether this con[illegible] or cancelled, unless the intermediary can be proved to be responsible for the non-fulfilment or cancellation of the contract.

§ 35 Arbitration

(1) [illegible] has been agreed, all claims arising out of this contract [illegible] referred to arbitration [illegible] year after the end of the period of fulfilment.

(2) [illegible] tration has been agreed, the plaintiff party has the right of [illegible]

(3) The [illegible] the arbitration rules of the competent court of arbitration [illegible] that purpose.

§ 36 Non-Compliance with an Award

(1) The C[illegible] association is entitled to publish, by posting on the notice board of the exchange or otherwise and [illegible] exchange [illegible] name of a party which has not complied with a final award or has not fulfilled a compromise agreed [illegible] of arbitration. Prior to taking such measure, the party concerned must be given [illegible] opportunity to state its

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7.5.77 KGS/HL MINIMUM GARANTI  AU DEBARQUEMENT REFACTIONNABLE ENTRE
77 KGS/HL ET 75 KGS /HL/DE 1  POINT POUR 1 EN FAVEUR ACHETEUR.
AU DESSOUS DE 75 KGS /HL  LA MARCHANDISE SERA DECLASSEE AUX RISQUES
ET PERILS DU VENDEUR.

MATIERES ETRANGERES ET INERTES :1 ) MAXIMUM
HUMIDITE :14 ) MAXIMUM
GRAINS ENDOMMAGES (BOUTES ):2) MAXIMUM
GRAINS PUNAISES : NEANT
VALEUR BOULANGERE:130 MINIMUM
GRAINS MAIGRES ET ECHAUDES :5 ) MAXIMUM
GRAINS CHAUFFES OU GERMES :NEANT
PRESENCE D ERGOT :1 POUR MILLE MAXIMUM
GRAINS MOUCHETES :5 ) MAXIMUM GARANTI AU DEBARQUEMENT
GRAINS NUISIBLES : NEANT
PROTEINE :11, 5) MINIMUM
INDICE ZELINY:A PRECISER SUR L OFFRE
CHUTE D'AGBERG :A PRECISER SUR L OFFRE

6)CADENCE AU DECHARGEMENT :1.000 TM/ JOUR
7)TIRANT D'EAU 28 PIEDS MAXIMUM A L'ARRIVEE AU 1ER PORT DE
DEBARQUEMENT
8)POIDS , QUALITE , CONDITIONNEMENT : FINAUX A L'EMBARQUEMENT SAUF
----- POIDS SPECIFIQUE GARANTI AU DEBARQUEMENT

9)EXTRA FRET : 1,50 DOLLARS USA LA TONNE METRIQUE SUR LA TOTALITE
DE LA CARGAISON

10)SURESTARIES /DESPATCH.
--------------------------/SELON CHARTE PARTY, MAIS MAXIMUM 4.000
DOLLARS DE SURESTARIES ET MOITIE DESPATCH.

11)CAUTION DE BONNE EXECUTION :10 ) DU MONTANT DU CONTRAT.
-------------
12)PAIEMENT / CONTRE REMISE DOCUMENTAIRE A 100 ) PAR AILLEURS VOUS
DEMANDONS PREVOIR DANS VOTRE OFFRE FINANCEMENT (CREDIT FOURNISSEUR,
CREDIT ACHETEUR ,  LIGNE DE CREDIT ETC...)

13)PENALITES DE RETARD :0,50 DOLLARS USA PAR TONNE ET PAR JOUR
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RECEPTION DES OFFRES ..
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LA DATE LIMITE DE RECEPTION DES OFFRES A L'OAIC EST FIXEE AU
LUNDI 29 SEPTEMBRE 1986 A 17 HEURES ALGERIENNES STOP LES OFFRES
DOIVENT ETRE TRANSMISES PAR TELEX OU ETRE DEPOSEES PAR UNE PERSONNE
DE VOTRE ORGANISME DUMENT MANDATEE , AU SIEGE DE L'OAIC /
BUREAU DES MARCHES )SIS AU 5 RUE FERHAT BOUSSAD ALGER (EX
MEISSONNIERSOUS DOUBLE ENVELOPPE CACHETEE STOP L'ENVELOPPE
EXTERIEURE DEVRA
PORTER LA MENTION ''CONSULTATION NR 13/86 DU 21.9.1986 NE PAS
OUVRIR '' STOP TOUTE OFFRE PARVENANT  APRES CETTE DATE NE SERA
PRISE EN CONSIDERATION STOP VOUS DEMANDONS DELEGUER  REPRESENTANT
DUMENT MANDATE POUR NEGOCIATION ET SIGNATURE
? EENNNTTTTUUUUUUUUUUUUUUUUUUUUUUU

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[illegible] DU
CONTRAT  MUNI DU CACHET DE VOTRE SOCIETE LE MARDI  30 SEPTEMBRE 1986
A [illegible] STOP PRESENCE OBLIGATOIRE STOP NEGOCIATIONS PAR TELEX ET
TELEPHONE NE SONT PAS ADMISES STOP SALUTATIONS STOP ET ~~FIN~~ OAIC
ALGER

SIGNE / LE DIRECTEUR GENERAL OAIC ALGER

[illegible] SIGNAT++++++++++++++++++++++??
[illegible]
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APPENDIX D

CATALOGUE OF SEED VARIETIES AND RELEASE CRITERIA

CATALOGUE OFFICIEL
DES ESPÈCES ET VARIÉTÉS

TOME 1

Plantes de grande culture

Édition 1987

gnis

Etabli sur propositions
du Comité technique permanent de la sélection des plantes cultivées
et arrêté par le Ministère de l'Agriculture

Blé tendre

(*Triticum aestivum L. emend. Fiori et Paol.*)

LISTE A

Identification de la variété Code GNIS 332	 Nom	Obtenteur et responsable	Inscription	Réinscription
	● Type hiver			
0129	**Abo** ●	Obt. SCANEB (F 8111)	1977	1987
0181	**Aboukir** ●	Obt. Desprez Veuve et Fils (F 8444) SOV	1981	-
0145	**Adam** ●	Co-Obt. Coop de Pau - CACBA (F 8071) SOV LBNR (A 8255)	1980	-
0152	**Aiglon** ●	Obt. UNISIGMA (F 8174) SOV	1980	radiée(8)
0149	**Albatros*** ●	Obt. Clovis Matton (B 8417) SOV R.C. SERASEM (F 9295)	1980	-
0107	**Alto** ●	Obt. RAGT (F 8029)	1975	1985
0300	**Alvina** ●	Obt. Coop de Pau - CACBA (F 8071) SOV	1983	-
0183	**Apexal** ●	Co-Obt. Coop de Pau - CACBA (F 8071) SOV LBNR (A 8255) R.M. Coop de Pau - CACBA (F 8071)	1982	-
0150	**Aquila** ●	Co-Obt. Nickerson RPB (GB 8202) SOV Nickerson IPB (F 8511) R.M. Nickerson RPB (GB 8202)	1981	-
0136	**Arcole** ●	Obt. Desprez Veuve et Fils (F 8444) SOV	1978	-
0366	**Aristide** ●	Obt. Semences de Provence (F 8236)	1984	-
0137	**Armada** ●	Obt. Nickerson RPB (GB 8202) SOV	1978	-
0127	**Arminda** ●	Obt. Van der Have (NL 8018) SOV R.M. Claude Benoist (F 8105)	1977	1987
0219	**Armur** ●	Obt. Lepeuple (F 8121) SOV	1984	-
0303	**Arsenal** ●	Obt. Semences de Provence (F 8236)	1983	-
0370	**Arvel**	Co-Obt. Mannesson (F 8108) SOV RAGT (F 8029) R.M. RAGT (F 8029)	1986	-
0252	**Aubaine** ●	Obt. SCANEB (F 8111)	1982	-
0349	**Austerlitz**	Obt. Desprez Veuve et Fils (F 8444) SOV	1985	-
0177	**Avalon** ●	Co-Obt. Plant Breeding Inst. (GB 8237) SOV NSDO (GB 8028) R.M. Desprez Veuve et Fils (F 8444)	1981	-
0108	**Axial** ●	Obt. Belloy (F 8130)	1975	1985
0139	**Beauchamp** ●	Obt. Lafite (F 8062) SOV	1978	-
0270	**Berlioz** ●	Obt. France Canada Semences (F 8164) SOV R.M. Union Blois (F 8527)	1984	-
0113	**Blason**	Obt. Pichot (F 8107) SOV	1976	radiée(7)
0369	**Boreal**	Obt. INRA (F 8235) R.M. RAGT (F 8029)	1985	-
0321	**Bosco**	Obt. Coop de Pau - CACBA (F 8071) SOV	1985	-
0348	**Brimstone** ●	Co-Obt. Plant Breeding Inst. (GB 8237) SOV NSDO (GB 8028) R.M. Desprez Veuve et Fils (F 8444)	1985	-
0194	**Camp Rémy** ●	Obt. UNISIGMA (F 8174) SOV	1980	-
0019	**Capelle-Desprez***	Obt. Florimond Desprez (F 8020) SOV	1946	radiée(7)
0017	**Capitole-Vilmorin** ●	A.D. Verneuil Recherche (F 8131) SOV	1964	1984
0164	**Carat** ●	Obt. UNISIGMA (F 8174) SOV	1980	-
0373	**Cargidoc*** ●	Obt. Semences Cargill (F 8102)	1984	-
0187	**Cargimarec** ●	Obt. Semences Cargill (F 8102)	1983	-
0192	**Cargo** ●	Obt. Group. Agricole Essonnois (F 8122) SOV	1981	-
0193	**Carlos** ●	Obt. Sogroup (F 8106) SOV	1981	-
0116	**Castan** ●	Obt. Sogroup (F 8106) SOV	1976	1986
0124	**Caton*** ●	Obt. Verneuil Recherche (F 8131) SOV	1977	1987
0341	**Centurion**	Obt. SERASEM (F 9295) SOV	1986	-
0390	**Champion**	Obt. Desprez Veuve et Fils (F 8444) SOV	1985	-

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LISTE A

Reinscription
1987
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radiée(8)
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1985
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1987
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1985
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radiée(7)
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-
radiée(7)
1984
-
-
-
-
1986
1987
-
-

LISTE A (suite)

Identification de la variete			Obtenteur et responsable			Inscription	Reinscription
Code GNIS	Nom						
332							
0420	**Champtal**		Obt.	Claude Benoist *(F 8105)*	SOV	1986	-
0191	**Choisel**	●	Obt.	Group. Agricole Essonnois *(F 8122)*	SOV	1981	-
0271	**Chopin**	●	Obt.	France Canada Semences *(F 8164)*	SOV	1984	-
			R.M.	Union Blois *(F 8527)*			
0399	**Cobra**		Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1986	-
0122	**Cocagne**	●	Obt.	UNCAC *(F 8017)*	SOV	1977	1987
			R.M.	SERASEM *(F 9295)*			
0126	**Copain***		Obt.	Claude Benoist *(F 8105)*	SOV	1977	radiée(7)
0402	**Corot**		Obt.	Verneuil Recherche *(F 8131)*	SOV	1985	-
0567	**Corsodor**		Obt.	SERASEM *(F 9295)*	SOV	1987	-
0260	**Courtel** (1)		Co-Obt.	INRA *(F 8235)*	SOV	1985	-
				Pichot *(F 8107)*			
				Rohm and Haas Seeds *(US 9513)*			
			R.M.	INRA *(F 8235)*			
				Pichot *(F 8107)*			
0104	**Courtôt**	●	Obt.	INRA *(F 8235)*		1974	1984
0469	**Créneau**		Obt.	SE.CO.CE Dromigny *(F 8041)*	SOV	1986	-
0101	**Darius**	●	Obt.	Verneuil Recherche *(F 8131)*	SOV	1974	1984
0338	**Davidoc**	●	Co-Obt.	Mennesson *(F 8108)*	SOV	1986	-
				Lemaire-Deffontaines *(F 8128)*			
			R.M.	Lemaire-Deffontaines *(F 8128)*			
0331	**Décibel**		Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1985	-
				Nickerson S.A. *(F 8662)*			
0383	**Déclic**		Obt.	Pichot *(F 8107)*	SOV	1985	-
0291	**Divio**	●	Obt.	INRA *(F 8235)*		1984	-
0311	**Duck**		Co-Obt.	UNISIGMA *(F 8174)*	SOV	1985	-
				LBNR *(A 8255)*			
			R.M.	UNISIGMA *(F 8174)*			
0307	**Ecrin**		Obt.	Rustica *(F 9601)*	SOV	1985	-
0265	**Epiroux**	●	Obt.	SERASEM *(F 9295)*	SOV	1984	-
			R.M.	Ringot *(F 8126)*			
0031	**Etoile de Choisy***	●	Obt.	INRA *(F 8235)*		1950	1986
0186	**Faust**	●	Obt.	Verneuil Recherche *(F 8131)*	SOV	1981	-
0140	**Favori**	●	Obt.	Semences Cargill *(F 8102)*		1978	radiée(8)
			R.M.	Semences Cargill *(F 8102)*			
1014	**Festival***	●	Obt.	Claude Benoist *(F 8105)*	SOV	1981	-
0203	**Feuvert**	●	Obt.	Mennesson *(F 8108)*	SOV	1984	-
0134	**Fidel***	●	Obt.	Pichot *(F 8107)*	SOV	1978	-
0173	**Fleuron**	●	Obt.	Occitane des Semences *(F 8392)*		1982	-
			R.M.	Rustica *(F 9601)*			
0115	**Fleurus**		Obt.	Sogroup *(F 8108)*		1976	radiée(7)
0171	**Floréal**	●	Obt.	Dr Hege *(D 8219)*	SOV	1984	-
			R.M.	Rustica *(F 9601)*			
0352	**Florin**		Obt.	Lepeuple *(F 8121)*	SOV	1985	-
0212	**Fluto**	●	Obt.	Blondeau *(F 8030)*	SOV	1982	-
0264	**Foison**		Obt.	Rustica *(F 9601)*	SOV	1985	-
0159	**Fortin**		Obt.	Sogroup *(F 8108)*	SOV	1980	radiée(7)
0323	**Fortuna**	●	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1984	-
0151	**Frandoc**	●	Obt.	INRA *(F 8235)*		1980	-
0249	**Friedland**	●	Obt.	Desprez Veuve et Fils *(F 8444)*	SOV	1983	radiée(8)
			R.M.	Coop. Mathieu *(F 9701)*			
0142	**Gala**	●	Obt.	Saint-Jeannet-Lasserre *(F 8101)*		1978	-
			R.M.	Rustica *(F 9601)*			
0324	**Galaxie**	●	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1984	-
0188	**Garant**	●	Obt.	Ringot *(F 8126)*	SOV	1981	-
			R.M.	SERASEM *(F 9295)*			

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LISTE A (suite)

Identification de la variete				Obtenteur et responsable		Inscription	Reinscription
Code GNIS	Nom						
332							
0178	**Gavroche**	●	Obt.	Adrien Momont et Fils *(F 8125)*	SOV	1981	-
0403	**Gerbier**		Obt	INRA *(F 8235)*		1986	-
0110	**Glanor**		Obt	Mennesson *(F 8108)*	SOV	1976	radiee(7)
			R M	Claeys-Semences *(F 8185)*			
0379	**Goelent**		Obt	INRA *(F 8235)*		1985	-
			R M	Caussade Semences *(F 8197)*			
0162	**Hamilcar**	●	Obt	Verneuil Recherche *(F 8131)*	SOV	1980	-
0042	**Hardi**	●	Obt	Adrien Momont et Fils *(F 8125)*	SOV	1969	1984
0044	**Heurtebise***		Obt	Blondeau *(F 8030)*	SOV	1954	radiee(7)
0125	**Hobbit**	●	Obt	Plant Breeding Inst *(GB 8237)*	SOV	1977	radiee(8)
			R M	Florimond Desprez *(F 8020)*			
0176	**Horace**	●	Obt	Verneuil Recherche *(F 8131)*	SOV	1981	-
0157	**Iena**	●	Obt	Desprez Veuve et Fils *(F 8444)*	SOV	1980	-
0505	**Jade (1)**		Co-Obt	INRA *(F 8235)*	SOV	1986	-
				UNISIGMA *(F 8174)*			
				Rohm and Haas Seeds *(US 9513)*			
0143	**Jano**	●	Obt.	Blondeau *(F 8030)*	SOV	1978	radiée(8)
0048	**Joss***		Obt.	Cambier *(F 8127)*	SOV	1966	radiée(7)
0182	**Lodi**	●	Obt.	Desprez Veuve et Fils *(F 8444)*	SOV	1981	-
0098	**Lutin**	●	Obt	Ringot *(F 8126)*	SOV	1974	1984
			R M	SERASEM *(F 9295)*			
0050	**Magali-Blondeau**	●	Obt.	Blondeau *(F 8030)*	SOV	1962	radiee(8)
0146	**Marignan**	●	Obt	Coop. de Froissy *(F 8617)*		1980	-
0362	**Martial**		Obt.	Pichot *(F 8107)*	SOV	1986	-
0195	**Match**	●	Co-Obt.	Northrup King Semences *(F 8021)*	SOV	1981	-
				Claude Benoist *(F 8105)*			
			R M.	Northrup King Semences *(F 8021)*			
0158	**Mérit**	●	Obt.	Ringot *(F 8126)*	SOV	1980	radiée(9)
			R.M.	SERASEM *(F 9295)*			
0210	**Messidor**	●	Obt.	UNCAC *(F 8017)*		1982	radiee(8)
0407	**Milpain**		Obt.	Adrien Momont et Fils *(F 8125)*	SOV	1986	-
			R.M.	Momont Hennette et Fils *(F 9084)*			
0302	**Mission**	●	Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1983	-
				Nickerson S.A. *(F 8662)*			
			R M.	Nickerson RPB *(GB 8202)*			
0517	**Monitor**		Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1986	-
				Nickerson S.A. *(F 8662)*			
			R M.	Nickerson RPB *(GB 8202)*			
0470	**Monza (1)**		Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1986	-
				Nickerson S.A. *(F 8662)*			
			R M	Nickerson RPB *(GB 8202)*			
0298	**Moulin**	●	Co-Obt.	Plant Breeding Inst. *(GB 8237)*	SOV	1984	-
				NSDO *(GB 8028)*			
			R M	Desprez Veuve et Fils *(F 8444)*			
0184	**Nabuco**	●	Obt	Jorion et Fils *(B 8079)*	SOV	1982	-
			R M.	Cambier *(F 8127)*			
0199	**Nectar**		Obt.	Rustica *(F 9601)*	SOV	1985	-
0330	**Nougat**		Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1985	-
				Nickerson S.A. *(F 8662)*			
0117	**Orépi**		Obt.	Mennesson *(F 8108)*	SOV	1976	radiee(7)
0490	**Pactole**		Obt.	Tourneur grandes cultures *(F 8027)*	SOV	1986	-
			R M	Belloy *(F 8130)*			
0200	**Pernel**	●	Obt.	INRA *(F 8235)*		1983	-
0180	**Petrel**	●	Obt	Blondeau *(F 8030)*	SOV	1981	-

TE A (suite)

	Reinscription
1	-
6	-
6	radiée(7)
5	-
0	-
9	1984
4	radiée(7)
7	radiée(8)
1	-
0	-
6	-
3	radiée(8)
5	radiée(7)
1	-
4	1984
2	radiée(8)
0	-
5	-
1	-
0	radiée(9)
2	radiée(8)
5	-
1	-
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	radiée(7)
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Blé tendre

LISTE A (suite)

Identification de la variete			Obtenteur et responsable			Inscription	Reinscription
Code GNIS	Nom						
0279	Priam	●	Obt	Verneuil Recherche *(F 8131)*	SOV	1984	-
0109	Protinal	●	Obt	RAGT *(F 8029)*		1975	radiee(8)
0174	Pursang	●	Obt	Occitane des Semences *(F 8392)*		1982	-
			R M	Rustica *(F 9601)*			
0160	Radja	●	Obt	Occitane des Semences *(F 8392)*		1980	-
			R M	Rustica *(F 9601)*			
0185	Ramses	●	Obt	Cambier *(F 8127)*	SOV	1981	-
0268	Real		Obt	Mennesson *(F 8108)*	SOV	1985	-
			R M	RAGT *(F 8029)*			
0356	Recital	●	Obt	Claude Benoist *(F 8105)*	SOV	1986	-
0257	Rempart	●	Obt	SE CO CE Dromigny *(F 8041)*	SOV	1982	-
0223	Rescler	●	Obt	INRA *(F 8235)*		1983	-
0156	Riol	●	Obt	Cambier *(F 8127)*	SOV	1980	-
0118	Rivoli	●	Obt.	Desprez Veuve et Fils *(F 8444)*	SOV	1976	1986
0119	Roazon		Obt	INRA *(F 8235)*		1976	radiee(7)
0111	Rudi		Obt	Adrien Momont et Fils *(F 8125)*	SOV	1976	radiee(7)
0487	Rurik		Obt	Weibull *(S 8059)*	SOV	1986	-
			R M	Graines Franco-Suédoises *(F 8159)*			
				Momont Hennette et Fils *(F 9084)*			
0239	Sabre	●	Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1982	-
				Nickerson IPB *(F 8511)*			
			R M	Nickerson RPB *(GB 8202)*			—
0187	Scipion	●	Obt.	Verneuil Recherche *(F 8131)*	SOV	1981	-
0334	Score		Obt.	Verneuil Recherche *(F 8131)*	SOV	1985	-
0327	Sensor	●	Co-Obt.	Schweiger OHG *(D 8271)*		1984	-
				Caussade Semences *(F 8197)*			
			R M.	Caussade Semences *(F 8197)*			
0347	Storch		Co-Obt.	Lochow-Petkus *(D 8279)*	SOV	1985	radiée(8)
				Desprez Veuve et Fils *(F 8444)*			
0095	Talent*	●	Obt	Claude Benoist *(F 8105)*	SOV	1973	1983
0163	Tango	●	Obt.	Claude Benoist *(F 8105)*	SOV	1980	-
0194	Taresque	●	Obt.	INRA *(F 8235)*		1981	-
1013	Ténor*	●	Obt.	Claude Benoist *(F 8105)*	SOV	1981	-
0280	Thésee	●	Obt.	Verneuil Recherche *(F 8131)*	SOV	1983	-
0388	Titien		Obt.	Verneuil Recherche *(F 8131)*	SOV	1985	-
0081	Top	●	Obt.	Tourneur Frères *(F 9791)*	SOV	1970	1985
			R M	(S.O.C.) *(F 8557)*			
0242	Ulm	●	Obt.	Desprez Veuve et Fils *(F 8444)*	SOV	1983	radiee(8)
0406	Unic		Obt.	UNISIGMA *(F 8174)*	SOV	1986	-
0189	Vaillant	●	Obt.	Ringot *(F 8128)*	SOV	1982	radiee(8)
			R M	SERASEM *(F 9295)*			
0413	Viking		Obt.	Desprez Veuve et Fils *(F 8444)*	SOV	1986	-
0198	Vizir	●	Obt.	Occitane des Semences *(F 8392)*	SOV	1983	-
			R M	Rustica *(F 9601)*			
0096	Wattines*	●	Obt.	Florimond Desprez *(F 8020)*	SOV	1974	radiee(8)

Blé tendre

LISTE A (suite)

Identification de la variété			Obtenteur et responsable	Inscription	Réinscription
Code GNIS 333	Nom				
	• Type printemps				
0033	**Arkas** •	Obt.	Walter Engelen *(D 8270)* SOV	1978	-
0045	**Axona** •	Obt.	Van der Have *(NL 8018)* SOV	1983	-
		R M	Sem Diffusion *(F 8710)*		
0028	**Bastion** •	Obt.	Zelder *(NL 8023)* SOV	1976	1986
		R M	SERASEM *(F 9295)*		
0030	**Bayard** •	Obt.	Claude Benoist *(F 8105)* SOV	1977	radiée(8)
0047	**Briscard** •	Obt.	INRA *(F 8235)*	1984	-
0044	**Cornette** •	Co-Obt.	Weibull *(S 8059)* SOV	1983	radiée(8)
			Desprez Veuve et Fils *(F 8444)*		
		R M	Desprez Veuve et Fils *(F 8444)*		
0038	**Flambard** •	Obt.	Adrien Momont et Fils *(F 8125)* SOV	1979	-
0010	**Florence Aurore*** •	R M	Caussade Semences *(F 8197)*	1963	1986
			Semences de Provence *(F 8236)*		
0037	**Hermes** •	Obt.	Dr Hege *(D 8219)* SOV	1979	-
		R M	Lemaire-Deffontaines *(F 8128)*		
0174	**Jérico** •	Co-Obt.	Ringot *(F 8126)* SOV	1981	-
			Zelder *(NL 8023)*		
		R M	SERASEM *(F 9295)*		
0021	**Kolibri** •	Co-Obt	Lochow-Petkus *(D 8279)* SOV	1972	radiée(7)
			Florimond Desprez *(F 8020)*		
0041	**Lobo** •	Obt.	Lafite *(F 8063)* SOV	1982	-
0043	**Minaret** •	Obt	Zelder *(NL 8023)* SOV	1982	-
		R M	SERASEM *(F 9295)*		
0032	**Prinqual** •	Co-Obt.	Northrup King USA *(US 8641)* SOV	1978	-
			Claude Benoist *(F 8105)*		
0027	**Pronto**	Obt.	Ringot *(F 8126)*	1976	radiée(7)
0018	**Rex-Vilmorin** •	A D	Verneuil Recherche *(F 8131)* SOV	1962	1987
0039	**Rock** •	Obt.	Dr Hege *(D 8219)* SOV	1980	-
		R M	Lemaire-Deffontaines *(F 8128)*		
0022	**Sirius** •	Obt.	Von Rümker *(D 8220)* SOV	1972	radiée(8)
		R M.	Lafite *(F 8063)*		
0051	**Ventura**	Obt.	Lafite *(F 8063)* SOV	1985	-
0036	**Wim** •	Co-Obt.	Verenigde Kweekbedrij. *(NL 8315)* SOV	1979	-
			UNCAC *(F 8017)*		
		R M	SERASEM *(F 9295)*		

NOTES

(1) ***Variété hybride chimique :*** Courtel, Jade et Monza

- ***Déclarations de synonymies relevées :***

Albatros	Azor (Espagne)
Cappelle Desprez	Cappelle (Irlande)
Cargidoc	Cargifaro (Espagne)
Caton	Alcotan (Espagne)
Copain	Oroel (Espagne)
Etoile de Choisy	Estrella (Espagne)
Festival	Manero (Espagne)
Fidel	Fiel (Espagne)
Florence Aurore	Florence Aurora (Espagne)
Heurtebise	Stormguard (Gde-Bretagne)
Joss	Joss Cambier (Gde-Bretagne)
Talent	Talento (Espagne)
Tenor	Golo (Espagne)
Wattines	Flanders (Grande-Bretagne)

A (suite)

Reinscription
-
-
1986
radiée(8)
-
radiée(8)
-
1986
-
-
radiée(7)
-
-
-
radiée(7)
1987
-
radiée(8)
-
-

Blé tendre

(Triticum aestivum L. emend. Fiori et Paol.)

LISTE A

Variétés non panifiables

Identification de la variete		Obtenteur et responsable	Inscription	Reinscription
Code GNIS	Nom			
332				
	• Type hiver			
0438	**Apollo** ●	Obt Breun *(D 8359)* SOV R M UNISIGMA *(F 8174)*	1986	-
0202	**Arcane** ●	Obt Semences de Provence *(F 8236)*	1983	-
0179	**Belaviso** ●	Obt. Pichot *(F 8107)* SOV	1981	-
0112	**Corin** ●	Obt. Nickerson RPB *(GB 8202)* SOV R M Verneuil Recherche *(F 8131)*	1976	1986
0263	**Cosmos** ●	Obt Rustica *(F 9601)* SOV	1984	-
0354	**Damier**	Obt. Sogroup *(F 8106)* SOV	1986	-
0131	**Disponent** ●	Obt. Bayerrische Pflanz. *(D 8360)* SOV R M France Canada Semences *(F 8164)*	1980	-
0170	**Festin** ●	Obt Occitane des Semences *(F 8392)* R M Rustica *(F 9601)*	1982	-
0240	**Galahad** ●	Co-Obt Plant Breeding Inst. *(GB 8237)* SOV NSDO *(GB 8028)* R M. Desprez Veuve et Fils *(F 8444)*	1984	-
0147	**Magister** ●	Obt. Cabeco *(NL 8033)* SOV	1980	-
0093	**Maris Huntsman*** ●	Obt. Plant Breeding Inst. *(GB 8237)* SOV R M. Florimond Desprez *(F 8020)*	1973	1983
0201	**Master** ●	Obt. Miln Marsters Group *(GB 8387)* SOV R M SERASEM *(F 9295)*	1983	-
0221	**Promentin** ●	Obt. SERASEM *(F 9295)* SOV	1983	-
0161	**Rotonde** ●	Obt. : Zelder *(NL 8023)* SOV R M. : SERASEM *(F 9295)*	1980	-
0389	**Tarquin**	Obt. : Verneuil Recherche *(F 8131)* SOV	1985	-
0326	**Tracy** ●	Obt. : Coop de Pau - CACBA *(F 8071)* SOV	1984	-
0256	**Vesco** ●	Obt. : Cabeco *(NL 8033)* SOV	1982	radiee(8)
0436	**Voyage**	Co-Obt. : Nickerson RPB *(GB 8202)* SOV Nickerson S.A. *(F 8662)* R M. : Nickerson RPB *(GB 8202)*	1985	-

* ***Declaration de synonymie relevee:***

Maris Huntsman	Huntsman (Danemark)

Blé tendre

LISTE B

Identification de la variete		Obtenteur et responsable			Inscription	Reinscription
Code GNIS	Nom					
032						
	● Type hiver					
0444	**Acor**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1985	-
0325	**Alcan**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1984	-
0364	**Ambassador** ●	Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1984	-
			Nickerson S A *(F 8662)*			
		R M	Nickerson RPB *(GB 8202)*			
1015	**Aranda** ●	Obt.	Semences de Provence *(F 8236)*		1981	-
0488	**Armattan**	Obt.	Semences de Provence *(F 8236)*		1986	-
0332	**Belvedère**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1985	-
0304	**Cargicap**	Obt.	Semences Cargill *(F 8102)*		1985	-
0021	**Champlein** ●	Obt.	Claude Benoist *(F 8105)*	SOV	1955	1986
0351	**Dartagnan**	Obt.	Desprez Veuve et Fils *(F 8444)*	SOV	1985	-
0367	**Djinn**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1984	-
0322	**Domi**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1984	-
0516	**Evesio**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1986	-
0353	**Flandrin**	Obt.	Lepeuple *(F 8121)*	SOV	1985	-
0394	**Guépard**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1986	-
0375	**Lulli**	Obt.	Epi de France *(F 9294)*		1986	-
0339	**Marathon**	Obt.	Blondeau *(F 8030)*		1986	-
0116	**Marius** ●	Obt.	Claude Benoist *(F 8105)*	SOV	1976	1986
0429	**Météor** ●	Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1985	-
			Nickerson S.A. *(F 8662)*			
		R.M.	Nickerson RPB *(GB 8202)*			
0320	**Moranval**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1984	-
1003	**Palmaress-Cambier**	Obt.	Cambier *(F 8127)*	SOV	1964	1984
0468	**Pégaze**	Obt.	Coop de Pau - CACBA *(F 8071)*	SOV	1986	-
0287	**Pluton**	Obt.	Cambier *(F 8127)*	SOV	1985	-
0435	**Soleil**	Obt.	Lemaire-Deffontaines *(F 8128)*		1985	-
0329	**Tagora**	Co-Obt.	Nickerson RPB *(GB 8202)*	SOV	1984	-
			Nickerson S.A. *(F 8662)*			
		R.M.	Nickerson RPB *(GB 8202)*			
0371	**Tito**	Co-Obt.	Mennesson *(F 8108)*	SOV	1985	-
			RAGT *(F 8029)*			
		R.M.	RAGT *(F 8029)*			
0428	**Trida**	Obt.	INRA *(F 8235)*		1986	-

APPECIATION DE LA VALEUR AGRONOMIQUE DU BLE TENDRE

en fonction
- du rendement par rapport au témoin
- de la valeur d'utilisation
- des caractéristiques de régularité du rendement

SEUIL DE RENDEMENT PAR RAPPORT AU TEMOIN THEORIQUE (%)
Blé tendre hiver zone I et II
Blé tendre printemps

CARACTERISTIQUES AGRONOMIQUES			VALEUR D'UTILISATION (Classes technologiques)				
FAVORABLES	DEFAVORABLES pouvant avoir des conséquences :						
	Très graves	Graves	**A**	**B**1	**B**2	**C**1 **D**1	**C**2 **D**2
1 obligatoire	0	0	A l'appréciation de la section	95	97	102	105
	0	0		98	100	105	108
*	0	1		104	106	111	114
La section appréciera l'incidence de chaque caractéristique si le rendement est:				> 110	> 112	> 117	> 120

* En fonction de l'intérêt des caractéristiques favorables, la section apprécie s'il y a lieu d'être plus tolérant sur le nombre de caractéristiques défavorables.

DEFINITION DES CATEGORIES DE QUALITE DU BLE TENDRE D'HIVER

W (1)	PANIFICATION CNERNA	TENEUR EN PROTEINES (2)	BLE PANIFIABLE Catégorie	BLE IMPANIFIABLE Catégorie
	PANIFICATION SPECIALE (3)		A	
190 % de CAPITOLE				
			B 1	
	CAPITOLE			
			B 2	
90 % de CAPITOLE				
			C 1	
	TALENT			
			C 2	
Indéterminé	Non machinable	≥ 110 %		D 1
		< 110 %		D 2

(1) Exprimée en valeur relative par rapport à CAPITOLE.

(2) Exprimée en valeur relative par rapport à CAPITOLE + TALENT/2

(3) Effet améliorant mesuré par incorporation de 10 et 20% de la variété à une farine faible nettement définie.

Remarque

Toute discordance entre les classements de W et de panification fera l'objet d'une interprétation particulière.

MARS 1982.

APPENDIX E

EXAMPLE OF FRENCH LOADING LOG

Recieved from SGS Rouen, France

1/

Rapport final d'embarquement de céréales de M. FOSSE LEFRANÇOIS Gilles

M/V : " BUDOWLANY "

Exportateur : FERRUZZI TRADING INTERNATIONA

Commencé le : 29 JUIN 1987 à 13H30

Nature de la marchandise : BLÉ de MEUNERIE 2EX

Terminé le : 30 JUIN 1987 à 23H15

Placé : SILO SIMAREX / SICA 2

Manutention : SCAC / SIMAREX

Destination : POLOGNE (Poland) / ONE POLISH PORT

ETA : Le 5 Juillet 87 à 18H00

TE : MAXI 8m82

Dates	1	2	3	4	5	6	7	8	9	Total
29 juin	☒	1.205 T	1.019 T	2.056 T	☒					4.280 T 000
30 juin	1.793 T	2.643 T	602 T	1.830 T	2.720 T					9.588 T 000
Total	1.793 T	3.848 T	1.621 T	3.886 T	2.720 T					13.868 T 000
Pleine Vide/VD	Full PLEINE	Full PLEINE	Part, Full VIDANGE	Full PLEINE	Full PLEINE					

Qualité moyenne :

P.S.	80.700		TW
H2O	14.35		MO
I.G.	1.15	1.50	Grain impurities
I.D.	0.35		Fm + Dmg
Cassés	3.85		BKN
Germés	0.45		SPROUT

Échantillonnage : 3 bocaux + 1 sac 1KG. cachetés, par lots de 2.500 T dont sac au livreur et bocaux en réserve S.G.S. + 1 moyen 5KG. Par lots de 5.000 T, un moyen remis au Labo CAEPIN pour Gluten, Protéines, Hagberg. Par 5.000 T, cachetage de 5 échantillons ONIC en sacs poly. 5KGS, dont 1 remis au Labo CAEPIN pour Analyses A

Sampling 3 boxes + 1 sack 1 kg sealed by lots of 2.500 tons of which sack to shipper & boxes in file SGS + 1 average 5kg by lots of 5.000 T an ave given to Labo Caepin for Gluten, Pro., Hagberg by 5.000 T sealing of 5 samples ONIC in poly sacks of 5kgs of which 1 was given to

Répartition :

SIMAREX	Elev	4.280 T 000
SICA 2	Elev	9.588 T 000
		13.868 T 000

.. Loading. 103

Rapport Journalier d'embarquement de céréales de M. "FRINGAULT / FOSSE LEFRANÇOIS" Rapport n° : 2

M/V : "BUDOWLANY" Exportateur : FERRUZZI

Journée du : 30 juin 1987 de 07:30 à 13:30 et de 13:30 à 19:30 et de 19:30 à 01:30

Place : Silo SICA 2 Cap : AVAL Destination : POLOGNE

	SICA 2	SIMAREX		Ce Jour This day	Précédent Preceding	A ce Jour To this day	Qualité		
1	1.793T,000			1.793T,000		1.793T,000	BLE de MEUNERIE		
2	2.643T,000			2.643T,000	1.205T,000	3.848T,000			
3	602T,000			602T,000	1.019T,000	1621T,000	P.S.	80.450	
4	1.830T,000			1.830T,000	2.056T,000	3.886T,000	H2O	14.25	
5	2.720T,000			2.720T,000		2.720T,000	I.G.	1.20	1.55
6							I.D.	0.35	
7							Cassés	3.10	
8							Germés cecydo	0.40	
9									
ce jour	9.588T,000			9.588T,000					
précédent		4.280T,000			4.280T,000				
Total	9.588T,000	4.280T,000				13.868T,000			

État de faits :

Hold Portiques : 1 Portique en SEANCES 1, 2 et 3

. Mise en route . 7:30

. Fin du chargement à . 23H.15

339

Rapport Journalier d'embarquement de céréales de M. WIALLYN. Page 3 Rapport n° : 1

M/V : BUDOWLANY Exportateur : FERRUZZI

Journée du : 29.06.1987 de 13.^{30} à 19^{30} et de à et de à

Placé : SILO SIMAREX Cap : AMONT Destination : POLOGNE

310

	SIMAREX			Ce Jour	Précédent	A ce Jour	Qualité		
1							BLÉ DE MEUNERIE		
2	1205^{T}000			1205^{T}000		1205^{T}000			
3	1019^{T}000			1019^{T}000		1019^{T}000	PS	81.20	
4	2056^{T}000			2056^{T}000		2056^{T}000	H_2O	14.50	
5							IG	1.10	
6							ID	0.30	
7							KC	5.30	
8							GER	0.30	
9							CECY	0.20	
ce jour	4280^{T}000			4280^{T}000					
précédent									
Total	4280^{T}000					4280^{T}000			

État de faits : 1. Portiques : DE 13^{30} A 19^{H}30

. MISE EN ROUTE 13^{H}30

. FIN A SIMAREX. 19^{H}15

M/V : BUDOWLANY

Date : 29. 06. 87

Marchandise : BLé de MEUNERIE

Agréeur : COUTURIER

SIMAREX L. D

①

Horaire Heure / Ton Tonnage	PS	Hte	Anomalies	Horaire / Tonnage	PS	Hte	Anomalies
250T	81 300	14 30		2750T	81.900	14 60	
500T	82 200	14 00		3000T	82.400	14 70	
750T	81 400	14 50		3250T	82.800	14 70	
1000T	81 600	14 30		3500T	81.900	14 60	
1250T	82 000	14 40		3750T	81.600	14 60	
1500T	82 700	14 30		4000T	81.400	14 70	
1750T	82 800	14 50		4250T	81.500	14 70	
2000T	82.600	14 60		4500T			
2250T	82 200	14 50		4750T			
2500T	82 700	14 70		5000T			
	—	—			—	—	
MOYENNE	82 150	14.41	du 1e Lot de 2500T	MOYENNE	81.928	14 60	du 2e Lot de 2500T

Anomalies : (Sur analyse visuelle à chaque prélèvement).

82.040 14.51.

Flair autre que l'odeur normale de la céréale - Insectes vivants.

Autres céréales que la céréale de base - Coloration anormale, etc...

" BUDOWLANY " Date : Le 30 JUIN 1987

Marchandise : BLE de MEUNERIE Agréeur : WALLYN

②

SICA 21

Horaire / Tonnage	PS	H^{té}	Anomalies
	Lectures	Directes	
250^{T}	82.100	14.20	
500^{T}	82.100	14.20	
750^{T}	82.200	14.30	
1.000^{T}	82.200	14.50	
1.250^{T}	82.300	14.20	
1.500^{T}	82.300	14.50	
1.750^{T}	82.400	14^{40}	
2000^{T}	82.000	14^{50}	
2250^{T}	81.200	14^{30}	
2500^{T}	81^{600}	14^{30}	
	———	———	
Moyenne	82.040	14^{34}	1er lot de 2.500^{T}

Horaire / Tonnage	PS	H^{té}	Anomalies
2750^{T}	81.920	14^{20}	
3000^{T}	81.600	14^{20}	
3250^{T}	82.000	14^{00}	
3500^{T}	82.400	14^{10}	
3750^{T}	82.000	14^{10}	
4000^{T}	81.700	14^{00}	
4250^{T}	80^{900}	13^{70}	
4500^{T}	81^{100}	13^{90}	
4750^{T}	80^{700}	14^{40}	
5000^{T}	80^{800}	14^{60}	
	———	———	
Moyenne	81^{50}	14^{12}	2^{e} lot de 2.500^{T}

Anomalies : (Sur analyse visuelle à chaque prélèvement).

Flair autre que l'odeur normale de la céréale - Insectes vivants.

3.12

Autres céréales que la céréale de base - Coloration anormale, etc...

M/V : BUDOWLANY. Date : le 30 JUIN 1937

Marchandise : Blé de Meunerie. Agréeur : COUTURIER

③

SICA2

Horaire / Tonnage	PS	H^{te}	Anomalies
	lectures Directes		
5250T	81^{200}	14^{30}	
5500T	81^{-}	13^{80}	
5750T	80^{900}	13^{50}	
6000T	79^{400}	14^{60}	
6250T	80^{100}	14^{40}	
6500T	81^{600}	14^{50}	
6750T	81^{400}	14^{70}	
7000T	82^{200}	14^{50}	
7250T	81^{400}	14^{20}	
7500T	80^{800}	14^{40}	
Moyenne	81^{060}	14^{33}	3e lot de 2500T

Horaire / Tonnage	PS	H^{te}	Anomalies
7750T	80.900	14^{50}	
8000T	81.200	14^{30}	
8250T	81.700	14^{40}	
8500T	81^{400}	14^{00}	
8750T	81^{200}	14^{10}	
9000T	81^{400}	14^{00}	
9250T	81^{200}	14^{30}	
9500T	81^{200}	14^{20}	
moyenne	81.257	14.22	4ème LOT de

Anomalies : (Sur analyse visuelle à chaque prélèvement).

Flair autre que l'odeur normale de la céréale - Insectes vivants.

Autres céréales que la céréale de base - Coloration anormale, etc...

APPENDIX F

EC REGULATIONS FOR FIXING STANDARD QUALITIES OF WHEAT

REGULATION (EEC) No 2731/75 OF THE COUNCIL Page 1

of 29 October 1975

fixing standard qualities for common wheat, rye, barley, maize and durum wheat

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 43 thereof;

Having regard to Council Regulation (EEC) No 2727/75 (1) of 29 October 1975 on the common organization of the market in cereals, and in particular Article 2 (4) thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament (2);

Whereas the common prices for common wheat, rye, barley, maize and durum wheat must be fixed with reference to specific standard qualities; whereas these should correspond as far as possible to the average qualities of those cereals harvested within the Community;

Whereas the standard qualities were fixed by Council Regulation No 365/67/EEC (3) of 14 November 1967; whereas the definitions contained in that Regulation of matter other than basic cereals of unimpaired quality have been difficult to apply; whereas they should therefore be made more specific and, moreover, the methods of determining such matter and the moisture content should be supplemented and harmonized,

HAS ADOPTED THIS REGULATION:

Article 1

The standard quality for which the target price and the intervention prices for common wheat are fixed is defined as follows:

(a) common wheat of a sound and fair marketa quality, free from abnormal smell and live pe of a colour proper to this cereal and of a qua corresponding to the average quality of comm wheat harvested under normal conditions in Community;

(b) moisture content: 16%;

(c) total percentage of matter other than basic cere of unimpaired quality: 5%, of which:

- percentage of broken grains: 2%,
- percentage of grain impurities: 1·5% ('gra impurities' means shrivelled grains, grains other cereals, grains damaged by pests a grains showing discoloration of the germ),
- percentage of sprouted grains: 1%,
- percentage of miscellaneous impurities: 0·5 ('miscellaneous impurities' consist of wee seeds, damaged grains, extraneous matte husks, ergot, decayed grains, dead insects an fragments of insects);

(d) specific weight: 75 kilogrammes per hectolitre.

Article 2

The standard quality for which the target price an the intervention price for rye are fixed is defined a follows:

(a) rye of a sound and fair marketable quality, free from abnormal smell and live pests, of a colour proper to this cereal and of a quality corresponding to the average quality of rye harvested under normal conditions in the Community;

(b) moisture content: 16%;

(c) total percentage of matter other than basic cereals of unimpaired quality: 5%, of which:

- percentage of broken grains: 2%,
- percentage of grain impurities: 1·5% ('grain impurities' means shrivelled grains, grains of other cereals and grains damaged by pests),

---

(1) See page 1 of this Official Journal.

(2) Opinion delivered on 16 October 1975 (not yet published in the Official Journal).

(3) OJ No 279, 18. 11. 1967, p. 2.

Reproduced from best available copy.

— percentage of sprouted grains: 1%,

— percentage of miscellaneous impurities: 0·5% ('miscellaneous impurities' consist of weed seeds, damaged grains, extraneous matter, husks, ergot, dead insects and fragments of insects);

(d) specific weight: 71 kilogrammes per hectolitre.

Article 3

The standard quality for which the target price and the intervention price for barley are fixed is defined as follows:

(a) barley of a sound and fair marketable quality, free from abnormal smell and live pests, of a colour proper to this cereal and of a quality corresponding to the average quality of barley harvested under normal conditions in the Community;

(b) moisture content: 16%;

(c) total percentage of matter other than basic cereals of unimpaired quality: 4%, of which:

— percentage of grain impurities: 2% ('grain impurities' means shrivelled grains, grains of other cereals and grains damaged by pests),

— percentage of sprouted grains: 1%,

— percentage of miscellaneous impurities: 1% ('miscellaneous impurities' consist of weed seeds, damaged grains, extraneous matter, husks, dead insects and fragments of insects);

(d) specific weight: 67 kilogrammes per hectolitre.

Article 4

The standard quality for which the target price and the intervention price for maize are fixed is defined as follows:

(a) maize of a sound and fair marketable quality, free from abnormal smell and live pests;

(b) moisture content: 15%;

(c) total percentage of matter other than basic cereals of unimpaired quality: 8%, of which:

— percentage of broken grains: 2% ('broken grains' means pieces of grain or grains which pass through a sieve with a circular mesh 4·5 millimetres in diameter),

— percentage of grain impurities: 4% ('grain impurities' means grains of other cereals, grains damaged by pests and grains of abnormal coloration, the latter being grains which have acquired through heating a darkish brown colour on a fairly substantial part of the tegument and of the kernel and are not damaged grains),

— percentage of sprouted grains: 1%,

— percentage of miscellaneous impurities: 1% ('miscellaneous impurities' consist of weed seeds, damaged grains, extraneous matter, husks, dead insects and fragments of insects).

Article 5

The standard quality for which the target price, the intervention price and the guaranteed minimum price for durum wheat are fixed is defined as follows:

(a) durum wheat of a sound and fair marketable quality, free from abnormal smell and live pests, dry, amber yellow to brown in colour, with a vitreous section of translucent, horny appearance and of a quality corresponding to the average quality of durum wheat harvested under normal conditions in the Community;

(b) total percentage of matter other than durum wheat grains of unimpaired quality: 24·5%, of which:

— percentage of durum wheat grains which have wholly or partly lost their vitreous aspect (mitadine) and common wheat grains: 20%, of which not more than 4% of common wheat grains,

— percentage of broken grains: 2%,

— percentage of grain impurities: 1·5% ('grain impurities' means shrivelled grains, grains of cereals other than durum wheat and common wheat, grains damaged by pests, grain, in which the germ is discoloured or moulded grains),

— percentage of sprouted grains: 0·5%,

— percentage of miscellaneous impurities: 0·5% ('miscellaneous impurities' consist of weed seeds, damaged grains, extraneous matter, husks, ergot, decayed grains, dead insects and fragments of insects);

(c) specific weight: 78 kilogrammes per hectolitre.

Article 6

For the purpose applying this Regulation:

(a) the matter other than basic cereals of unimpaired quality is defined in Annex I A, save as otherwise defined in this Regulation, and is determined according to the method laid down in Annex I B;

(b) moisture content shall be determined by reference to the method shown in Annex II;

(c) the method for determined 'mitadine' durum wheat grains shall be determined according to the procedure laid down in Article 26 of Regulation (EEC) No 2727/75.

Article 7

1. Council Regulation (EEC) No 768/69 (1) of 22 April 1969 fixing standard qualities for common wheat, rye, barley, maize and durum wheat, is hereby repealed.

2. References to the Regulation repealed by virtue of paragraph 1 shall be construed as references to this Regulation.

Article 8

This Regulation shall enter into force on 1 November 1975.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Luxembourg, 29 October 1975.

For the Council

The President

G. MARCORA

---

(1) OJ No L 100, 28. 4. 1969, p. 8.

APPENDIX G

SGS EXPORT CERTIFICATE

SGS France s.a.

16, rue du Louvre
Boite postale 275
75024 Paris Cedex 01
Tel. 260 39.25
Telegramme : Supervise
[illegible]

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Certificat N° 0601/ 51491-8

CERTIFICATE OF WEIGHT. СВИДЕТЕЛЬСТВО ВЕСА

We undersigned, S.G.S FRANCE S.A.	Мы, нижеподписавшиеся
hereby certify that,	свидетельствуем настоящим что,
by order of :	по заказу :
SOCIETE COMMERCIALE IPITRADE INTERAGRA INTERNATIONAL 152, Avenue de Malakoff 75116 PARIS	SOCIETE COMMERCIALE IPITRADE INTERAGRA INTERNATIONAL 152, Avenue de Malakoff 75116 PARIS
we supervised, at time of loading, the Weight of a lot of FRENCH MILLING WHEAT as specified hereunder :	мы контролировали во время погрузки вес партии французской мельной пшеницы определяемый ниже :
- In bulk ... 5.350.000 K° nett	- навалом 5.350.000 K° nett
Loaded on board : "VORKUTA"	- название судна : "VORKUTA"
from : ROUEN	- порт погрузки : ROUEN
to : ONE SOVIET PORT	- назначение : ONE SOVIET PORT
Weighing ex.storage warehouse, as well as loading, of the whole parcel on board the above mentioned vessel were performed under our control.	Мы контролировали взвешивание и погрузку целиком пшеницы, на вышеуказанное судно.

CONTRACT EXPORTKHLEB :01/61 201-134

ROUEN, 14th MAY 1987

S.G.S. QUALITEST

Membre du Groupe Société Générale de Surveillance

INSPECTION EFFECTUEE EN AME ET CONSCIENCE MAIS SANS RESPONSABILITE DE NOTRE PART. LE PRESENT CERTIFICAT NE LIBERE PAS LE VENDEUR DE SES RESPONSABILITES CONTRACTUELLES, PARTICULIEREMENT EN CAS DE VICE CACHE DE LA MARCHANDISE, NON DECELE AU MOMENT DE L'INSPECTION

SGS France s.a.

18, rue du Louvre
Boite postale 275
75024 Paris Cedex 01
Tel. 260 39.25
Telegramme : Supervise
Telex 210029

51491

Certificat N° 0601/ СВИДЕТЕЛЬСТВО КАЧЕСТВА И СОСТОЯНИЯ
CERTIFICATE OF QUALITY AND CONDITION.

We undersigned, S.G.S. FRANCE S.A.

hereby certify that,

by order of :

SOCIETE COMMERCIALE IPITRADE
INTERAGRA INTERNATIONAL
152, Avenue de Malakoff
75116 PARIS

we supervised, at time of loading, the Quality and Condition, of a lot of FRENCH MILLING WHEAT as specified hereunder :

- In bulk .... 5.350.000 K° nett

Loaded on board : "VORKUTA"
From : ROUEN
To : ONE SOVIET PORT

OUR FINDINGS : FRENCH MILLING WHEAT CROP YEAR 1986/1987 ARTIFICIALLY AND/OR NATURALLY DRIED.

SOUND, LOYAL & MERCHANTABLE, FREE FROM ANY FOREIGN ODOUR INCLUDING SOUR AND SWEETISH SMELL AND ANY LIVE INSECTS, QUARANTINE AND SANITARY OBJECTS, FUMIGATED AND SUITABLE FOR HUMAN CONSUMPTION.

-Natural weight : 79,700 KG/HL
- Moisture : 14,40 PCT
- Foreign matters : 1,80 PCT
- Protein (on dry basis) : 12,35 PCT
  N X 5,70
- Bug damaged kernels : 0,05 PCT
- Raw gluten : 24,15 PCT
  (as determined by methods, approved in the USSR)

Мы, нижеподписавшиеся,

свидетельствуем настоящим что,

по заказу :

SOCIETE COMMERCIALE IPITRADE
INTERAGRA INTERNATIONAL
152, Avenue de Malakoff
75116 PARIS

мы контролировали во время погрузки качество партии французской мелемой пшеницы определяемое ниже :

навалом 5.350.000 K° nett

название судна : "VORKUTA"
порт погрузки : ROUEN
назначение : ONE SOVIET PORT

Мы заключили : французская мелемая пшеница

Год сборки урожая : 1986/1987
Высушивание искусственное и/или естественное.
Зерно здоровое и пригодное к продаже. Оно не содержит посторонних запахов, включая кислый и сладковатый запах, не содержит живых вредителей, ни карантинных и санитарных объектов и пригодно к человеческому питанию.

= естественный вес : 79,700 KG/HL
- влажность : 14,40 PCT
- другие материи : 1,80 PCT
- протеины -для сухой материи- : 12,35 PCT
- испорченные зерна клопами : 0,05 PCT
- сырая клейковина 24,15 PCT
  / как определено методами, одобренными в С.С.С.Р./.

- Cargo in good condition at time of loading.- груз в хорошем состоянии при погрузке.

CONTRACT EXPORTKHLEB :01/61 201-134

ROUEN, 14th MAY 1987

Membre du Groupe Société Générale de Surveillance

S.G.S. QUALITEST

INSPECTION EFFECTUEE EN AME ET CONSCIENCE MAIS SANS RESPONSABILITE DE NOTRE PART. LE PRESENT CERTIFICAT NE LIBERE PAS LE VENDEUR DE SES RESPONSABILITES CONTRACTUELLES, PARTICULIEREMENT EN CAS DE VICE CACHE DE LA MARCHANDISE, NON DECELE AU MOMENT DE L'INSPECTION

APPENDIX H

COMPARISONS OF SAMPLING AND INSPECTION, AND HANDLING PRACTICES TO THE U.S.

TABLE 7.1. COMPARISON OF SAMPLING AND INSPECTION SYSTEM PRODUCE TO ELEVATOR

Statement	U.S.	France
Statement:	Inspection permissive	Every load of grain is inspected
Standards Applied	Elevator has option to use official inspectors or perform own inspection	All inspections performed by elevator personnel
Review Inspection	No review inspection performed on elevator inspection, but a submitted sample may be sent to Official Agency (O.A.)	No review inspection performed by surveying company may be called in to perform original inspection
Equipment Used to Obtain Sample	If sample is obtained by elevator personnel an open throat or compartmented trier or DT sampler may be used. If sample is drawn by OA a compartmented trier or mechanical sampler or other official method must be used	Method of obtaining sample varies from mech. probe to a quart container as grain flows from truck to dump pit

TABLE 7.2. COMPARISON SAMPLING AND INSPECTION SYSTEMS INTER-ELEVATOR MOVEMENTS (INCLUDING INBOUND TO EXPORT)

Activity	U.S.	France
Statement	Inspection permissive	Inspection based on requirements of contract. Surveying company inspects much of the grain going into export channels either at the loading or receiving elevator
Standards	Grain shipped between elevator may be of any grade	Grain shipped between elevators must meet the quality specified in the export contract. Grain not meeting specified export contract may be rejected by the surveying co. or receiving elevator

TABLE 7.3 COMPARISON SAMPLING AND INSPECTION SYSTEMS EXPORT

Activity	U.S.	France
Statement	Law requires inspection by official inspection personnel on all export grain except as provided in certain cases by waiver	As required by the contract a surveying company is hired to inspect export grain. ONIC may be requested by some state traders, by percentages of ONIC inspections is very low
Vessel Exam.	Vessel must be examined prior to loading for condition such as clean, dry free of live insects. Not more than two insects injurious to stored grain is allowed	Same as U.S. except that if a single live insect injurious to stored grain is found vessel is declared unfit to load
Export Quality	Any quality of grain may be exported that is agreed to under contract. Most U.S. grain grades either 2 or 3. Max limits are strived for by the elev. on each factor. Sublot results may exceed grade limit, but if they exceed cusome loading plan sublot is certified separately	Any quality of grain may be exported that is agreed to by the contract. Most wheat contracts require 75. KHL, 14.5-5-15% mo. 4.0% broken, 2.0% sprouted, 2.0% impurities with not more than 0.5% misc. impurities. Grain flow to the vessel is stopped whenever grain does not meet quality specified in contract
Sampling	DT sampler required	Mechanical sample for sublot analysis. Also samples taken from belt immediately prior to loading to insure it meets quality 100 percent of the time
Insect Exam	Examine 1250 grams from each 5,000 bushels loaded. Insect tolerance established by HB II	Random examination continuously during loading by surveyors attending belt. If a single insect is found, the entire ship hold must be fumigted
Samples Analyzed	Sublot samples of between 18 to 60K bushels are analyzed continuously during loading. Results are recorded on log	Sublot samples of between 500 to 2500 tons are analyzed. (Generally each hour) results are recorded on log
Final Grade Basis	Weighted or mathematical average of all sublots analyzed and final grade determined from these results	Weighted average of all 500 to 2500 tons are analyzed. (Generally each hour) results are recorded on log
Quality Control	Sublot samples are analyzed at the export elevator. Results immediately provided to the elevator. A statistically sound inspection (cu-sum) is used which allows a specified tolerance beyond the contracted grade limit	Sublot samples are analyzed by surveying company. Also surveying company has employee stationed on loading belt to immediately stop loading if grain does not meet quality specified in contract. No tolerance allowed

TABLE 7.4. COMPARISON GRAIN HANDLING PRACTICES FARM TO ELEVATOR MOVEMENT

Activity	U.S.	France
Statement	Received & placed in bin by quality often without cleaning or conditioning	Wheat is cleaned and placed in bins by variety according to milling and baking characteristics
Drying	High moisture grain is dried especially if it is going to be stored. Generally only dried to max level for storage. It will be stored or blended with other grain of different moisture	Wheat is seldom dried even though it is often harvested at 16.0% mo. Corn is harvested at 25-35% mo. Corn is either dried or stored in cribs on the farm
Cleaning	Generally grain is not cleaned when coming off the farm. It is binned by quality so it can be blended with other grain of different quality when loaded out. Many country elevs. do not have cleaners	Effective weed control provides low level of misc. impurities (FM & Dockage) Ave. 0.5% Most elevators clean grain before placing in bins for storage. All country elevators have cleaners
Insect Treatment	Little if any treatment for insects at a time of storage	All bins are treated before storing grain. Many elevators treat with a contact insecticide as grain is placed into bins
Storage	Generally stored in silo type bins which expedite blending at time of shipment. Grain is monitored for hot spots but little conditioning done when in storage	Generally stored in silo type bins but not for the purpose of blending at time of loading. Grain is often turned and sampled for end-use quality tests
Screening & FM	Little attempt by farmer to clean grain	Effective weed control and adjusting of combines provides low level of screenings when delivered to elevator
Disposal of Screenings	Generally used to mix with grain at time of loading to attain maximum limits allowed in contract	Generally sold to feed manufacturers. Is never added back to grain once removed

TABLE 7.5. COMPARISONS GRAIN HANDLING PRACTICES INTER-ELEVATOR MOVEMENTS (INCLUDING INBOUND TO EXPORT)

Activity	U.S.	France
General	Received and placed in bins according to quality	Most grain had already been cleaned, but they do bin by end use quality factors
Drying	Blending of high and low mo. grain is practiced in an effort to meet the maximum level contracted for, drying maybe necessary for storage	Most corn is dried as it comes off the farm, therefore there is little need to be concerned with drying on inter elevator shipments
Cleaning	Grain of different quality levels is blended together to meet grade and avoid cleaning. Some cleaning takes place in order to meet grade. Screenings are at times blended in to meet the max. allowed in a contracted grade	Since most grain is cleaned when it comes off the farm there is little concern with cleaning. Some cleaning is done at time of shipment depending on the specifications of the contract. There is a desire to ship clean grain so as to please the customer
Screenings Disposal	Generally used to mix with grain at time of loading to attain maximum limits allowed by contracted grade. Some is sold for arrival feed	Generally sold to feed manufacturers
Blending	Blending of different quality is commonly practices to meet the contracted grade	Some blending on wheat moving to export channel is done. There does not seem to be the desire or necessity to blend wide margins of different quality. Seldom are more than 2 bins blended together. No blending done on grain delivered to French miller

TABLE 7.6. COMPARISONS GRAIN HANDLING PRACTICES INTER-ELEVATOR MOVEMENTS (INCLUDING INBOUND TO EXPORT)

Activity	U.S.	France
General	Received and placed in bins according to quality	Most grain had already been cleaned, but they do bin by end use quality factors
Drying	Blending of high and low mo. grain is practiced in an effort to meet the maximum level contracted for, drying maybe necessary for storage	Most corn is dried as it comes off the farm, therefore there is little need to be concerned with drying on inter elevator shipments
Cleaning	Grain of different quality levels is blended together to meet grade and avoid cleaning. Some cleaning takes place in order to meet grade. Screenings are at times blended in to meet the max. allowed in a contracted grade	Since most grain is cleaned when it comes off the farm there is little concern with cleaning. Some cleaning is done at time of shipment depending on the specifications of the contract. There is a desire to ship clean grain so as to please the customer
Screenings Disposal	Generally used to mix with grain at time of loading to attain maximum limits allowed by contracted grade. Some is sold for arrival feed	Generally sold to feed manufacturers
Blending	Blending of different quality is commonly practices to meet the contracted grade	Some blending on wheat moving to export channel is done. There does not seem to be the desire or necessity to blend wide margins of different quality. Seldom are more than 2 bins blended together. No blending done on grain delivered to French miller

TABLE 7.7. COMPARISON, GRAIN HANDLING PRACTICES EXPORT

Activity	U.S.	France
Export Elevator	Received & placed in bins according to quality. Grain is seldom rejected regardless of quality	Received & placed in bins according to end use qualities. Grain is not meeting export contract specification is rejected by the export elevator
Drying	Most export elevators have large drying capabilities and grain, especially corn and soybeans is often dried at export facilities	Very few export elevators have driers, grain is conditioned prior to arriving at export elevator
Cleaning	Most export elevators have huge capacity for cleaning. Grain is often cleaned prior to exporting to meet the max. limit allowed by contract	Most export elevators do not have cleaners. Grain is expected to be clean when it arrives at export elevator or it is rejected
Screening	Generally used to mix with grain at time of loading to obtain maximum limits allowed under contract. Some is sold for animal feed	Since most elevators do not have cleaners grain is expected to be clean when it arrives at export elevator or it is rejected
Insect Infestation	Present U.S. standards allow up to 1 live insect in each 12,500 gram sample representing 5,000 bu of grain loaded. If more than the allowed tolerance is found loading may continue and the ship hold treated at completion of loading	If one live insect is found loading is stopped and a decision ismade as to whether the vessel with require fumigation

Background Paper No. 4

A Comparison of Quality Factors of Canadian and United States Grain Systems

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University of California-Davis

Andrew Schmitz
University of California-Berkeley

David M. Orr
Office of Technology Assessment

Robert A. Zortman
Federal Grain Inspection Service
U.S. Department of Agriculture

March 1989

Office of Technology Assessment
U.S. Congress

This background paper was prepared for the assessment "Enhancing the Quality of U.S. Grain for International Trade." The views expressed are those of the author(s) and not necessarily those of OTA.

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I. Overview of the Canadian System

The purpose of this report is to provide an overview of the Canadian cereal grain industry, focusing on the major crop which is wheat. The production, handling, and disposition of Canadian grains is covered in detail, followed by a description of international trade flows and government policies. This report is designed to provide the reader with background information on the size, scope and regulation of the Canadian grain industry. Where appropriate, comparisons are made between the Canadian and U.S. systems.

a. Production

Wheat contributes more to farm cash receipts in Canada than any other commodity. Beef is a close second. It is largely for climatic and agronomic reasons that wheat completely dominates the Canadian cereal grain industry. Normally about 29 m.ha. are cropped each year in Canada and close to 40 percent of this is sown to wheat. Most of the wheat is grown in the western "prairie" provinces of Alberta, Saskatchewan and Manitoba. In contrast, corn production takes place largely in the eastern province of Ontario. Almost all of the wheat is grown under dryland conditions with a very short growing season. The farms are quite large in western Canada (average size per producer is about 275 ha.) and the trend is towards even larger and more mechanized operations. Annual precipitation in the prairie regions ranges from 350 to 550 mm. The predominant crop is spring wheat rather than winter wheat. The planting season for spring wheat is in May and the harvesting takes place in late August through early October.

Table 1 presents production and export figures for the major Canadian grains. Measured by volume, the major grains/oilseeds produced are wheat, barley, corn, oats and canola. In terms of value the order of importance is wheat, canola, barley

Table 1

Canadian Grain Production and Exports
(thousands of tonnes)

	Crop Year (August 1 through July 31)					
Grain Crop	1982/83	1983/84	1984/85	1985/86	1986/87	Average (1982 to 1987)
Wheat						
Production	26,736	26,505	21,199	24,252	31,850	26,108
Exports	21,367	21,765	17,583	17,714	20,352	19,756
Oats						
Production	3,637	2,773	2,670	2,997	3,658	3,147
Exports	105	122	18	44	250	108
Barley						
Production	13,965	10,209	10,296	12,443	15,030	12,389
Exports	5,648	5,536	2,781	3,794	6,528	4,857
Rye						
Production	933	828	664	598	658	736
Exports	314	747	376	277	166	376
Flaxseed						
Production	752	444	694	902	1,057	770
Exports	430	621	560	623	660	579
Rapeseed/Canola						
Production	2,225	2,609	3,428	3,508	3,949	3,144
Exports	1,271	1,498	1,456	1,456	2,126	1,561
Corn						
Production	6,513	5,933	7,024	7,472	6,665	6,721
Exports	(248)	203	(42)	118	N/A	8
Soybeans						
Production	848	735	944	1,048	988	913
Exports	(302)	(219)	(104)	(2)	N/A	(156)

The data for 1986/87 are preliminary.

Source: Canada Grains Council, Statistical Handbook '86, Winnipeg, Manitoba and Canadian Grain Commission Canadian Grain Exports 1986/87.

and corn. Normally about 75 percent of the wheat, 50 percent of the canola and 50 percent of the barley is exported.

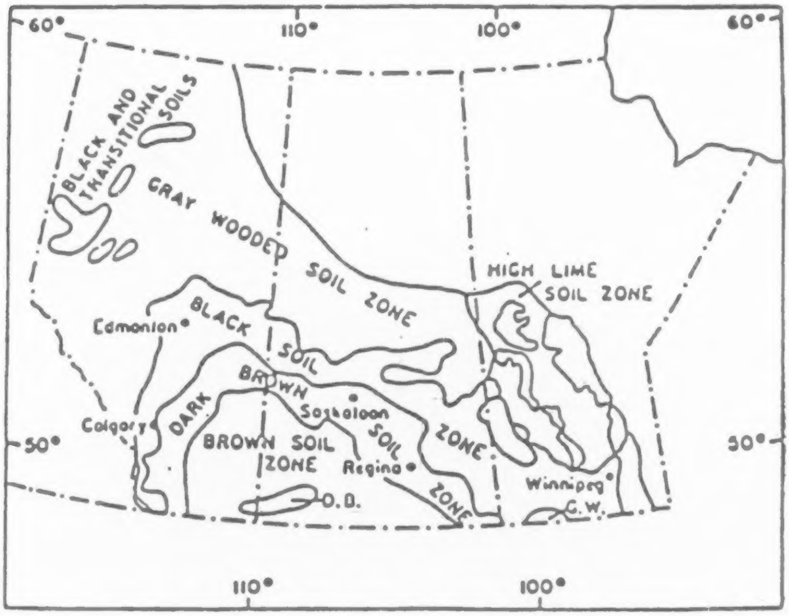
Western Canada can be divided into four soil zones which correspond closely to climatic and productions patterns: brown, dark brown, gray wooded and black (Figure 1). Low precipitation is the restrictive factor affecting crop production in the brown and dark brown soil zones. The gray wooded zone has a very short frost-free period (often less than 80 days) and low natural soil fertility. The black soil zone is very fertile and it usually receives more precipitation than the other soil zones (average 400+ mm). Its frost-free period may exceed 100 days. The wheat yields in the black soil zone are generally higher and less variable than in other areas of western Canada. However, protein content of the wheat grown in the black zone is typically low (Figure 2) compared to the wheats grown in the brown and dark brown soil zones. Protein content is important to the producer since it is a factor in the grading of No. 1 and No. 2 CWRS wheat.

Normally the province of Saskatchewan produces over 60 percent of the wheat in western Canada. The province of Alberta produces around 23 percent and Manitoba approximately 15 percent. The yields in Manitoba and Alberta average about 2 tonnes per ha., while in Saskatchewan the wheat yields average 1.8 tonnes per ha.

The standard class of wheat in Canada is hard red spring wheat which is high in both protein content and baking strength, both desirable characteristics for pan bread. In contrast, the dominant wheat in the United States is hard red winter and in Australia it is white wheat. Canada has a reputation for producing not only a high quality but also a very uniform wheat. There are four major classes of wheat grown: hard red spring; red winter; soft white spring; and amber durum. The red spring wheats are used around the world to blend with softer, weaker wheats (from other countries) for bread flour. All purpose flour for rolls, cakes and muffins is

Figure 1

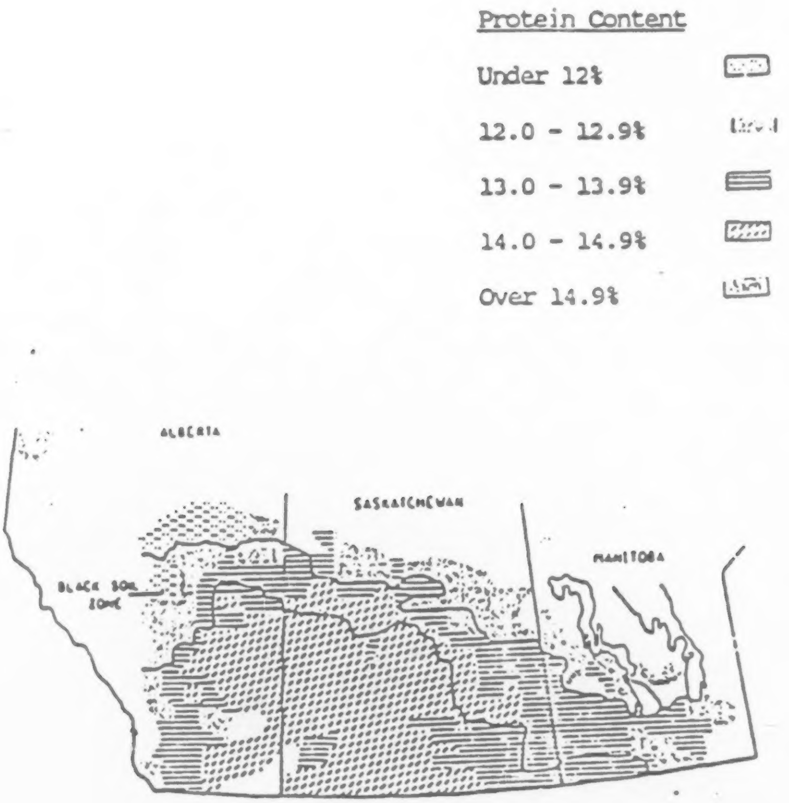
Soil Zones of Western Canada


60°
110°
100°
60°
BLACK AND TRANSITIONAL SOILS
GRAY WOODED SOIL ZONE
HIGH LIME SOIL ZONE
Edmonton
BLACK SOIL ZONE
Saskatoon
Calgary
DARK BROWN SOIL ZONE
BROWN SOIL ZONE
Regina
50°
50°
Winnipeg
G.W.
D.D.
110°
100°

Source: L. E. Evans, "Spring Wheat Production in the Black and Gray Soil Zones of Western Canada."

Figure 2

Protein Content of Wheat in Western Canada


Protein Content
Under 12%
12.0 - 12.9%
13.0 - 13.9%
14.0 - 14.9%
Over 14.9%
ALBERTA
SASKATCHEWAN
MANITOBA
BLACK SOIL ZONE

Source: L. E. Evans, "Spring Wheat Production in the Black and Gray Soil Zones of Western Canada."

milled from the red winter wheat and the soft white wheat. Durum wheat is used for pasta products.

The annual amount of wheat produced in Canada was shown in Table 1. About 85 percent of this production is hard red spring wheat and 10 percent durum. It is worth noting that production has increased considerably over the last fifteen years (from 9 to 24 mmt). Much of the increase in production which has come about in Canada is due to increased area rather than yield improvements. From Figure 3 it is clear there are year-to-year yield fluctuations in each exporting region but, on average, Canadian wheat yields have not increased significantly since the early 1970s. This is in sharp contrast to the case of wheat yields in the United States and the European Community. To statistically measure the growth of wheat yields in each major exporting region, yield was regressed on time for the 1970-84 period. The following equations were estimated with ordinary least squares estimation:

$$\text{Yield}_i = a_i + \beta_i \times \text{Time}, \quad i = \text{region}$$

The regression results are reported in Table 2. According to the estimated equations, the growth of yields in Canada and Australia is not statistically different from zero. Alternatively, yields in the EEC have grown annually by 121 kg/ha. In the United States yields have grown by 37 kg/ha per year. This converts to an annual growth rate of about one-half of one bushel per acre in the United States.

b. Production Technologies

Both the area planted to wheat and wheat yields are less in Canada than in the United States. Over the 1972-1985 period the Canadian area planted to wheat averaged 11,110 hectares annually, while the United States area averaged 26,467 hectares (Table 3). During the same period Canadian wheat yields averaged

FIGURE 3

Wheat Yields

Major Exporting Countries

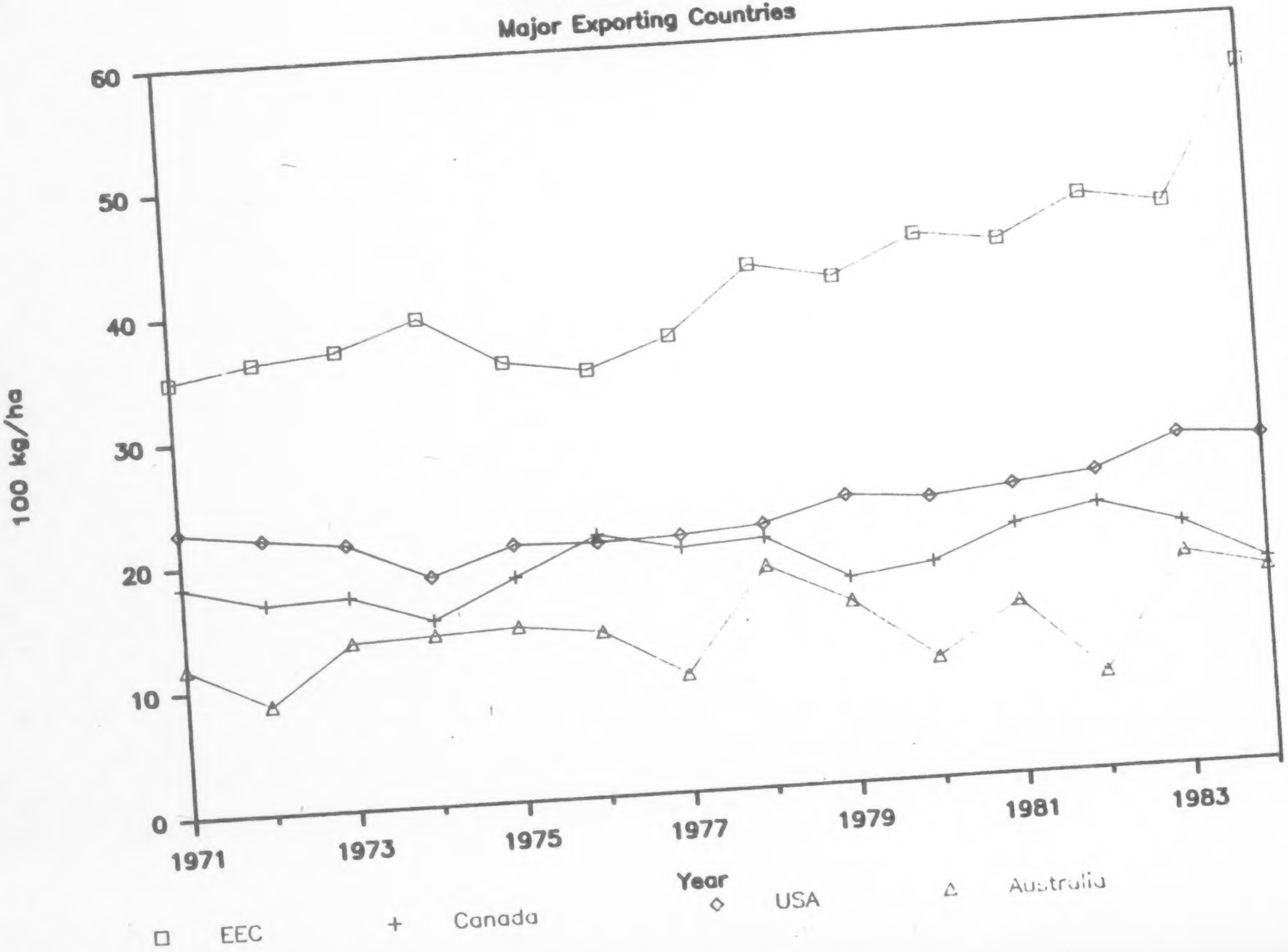


Table 2

Regression Results for Yield Growth Equations:
Yield = $\alpha + \beta$ Time

Exporter	α	β	R^2
EEC	32.79* (3.25)	1.21* (0.21)	0.72
Canada	17.52* (1.97)	0.12 (0.13)	0.07
USA	19.92* (1.65)	0.37* (0.11)	0.48
Australia	11.75* (3.09)	0.17 (0.20)	0.05

Note: Standard errors are in parentheses.

*Denotes statistical significance at the 5 percent level. Data obtained from the International Wheat Council World Wheat Statistics for the 1970-84 time period.

1.8 tonnes per hectare, compared to 2.2 tonnes per hectare in the United States. However, variability in both wheat area and yield is larger in the United States than in Canada. This is shown by the coefficients of variation, which are slightly higher for the United States in Table 3.

The higher yield in the United States is due to climatic conditions, varieties grown and fertilizer usage. Generally speaking, the winter varieties grown in the United States receive more rainfall than the spring varieties grown in Canada. Only 20-25 percent of the United States acreage is sown to the lower yielding spring varieties compared to over 95 percent in Canada. In addition the varieties grown in the United States are generally "semi-dwarf" or short-straw types. Many of these varieties are higher yielding than the taller wheats but Canadian regulations prevent the growing of most semi-dwarf varieties. It has been estimated elsewhere (Carter et al.) that Canadian wheat yields would improve significantly if semi-dwarf varieties were permitted. In the past few years a selected small number of semi-dwarf varieties have been licensed in Canada and this should contribute to higher average yields in Canada in future years.

It is difficult to obtain data on crop specific fertilizer application. However, it is generally true that Canadian farmers apply less fertilizer to wheat land than their United States counterparts. During the 1984/85 season total fertilizer sales in western Canada included 891,050 tonnes of Nitrogen and 456,865 tonnes of Phosphate fertilizers.

The application rate of phosphate fertilizer is relatively constant from crop to crop. Therefore, the application to wheat can be approximated by dividing total phosphate sales by total cropped acreage. This work out to about 17 kg/ha, or 15.5 lbs./acre, which is only about one-half of the rate recommended by Agriculture Canada. Alternatively, the application of Nitrogen varies substantially from crop to crop because of the large amount of fallowing which takes place on the Canadian

Table 3

U.S. and Canadian Wheat Area and Yields

	United States		Canada	
Year	Area (1000 ha)	Yield (100 kg/ha)	Area (1000 ha)	Yield (100 kg/ha)
1972	19142	22.0	8640	16.8
1973	21913	21.3	9430	17.1
1974	26453	18.4	8934	14.9
1975	28125	20.6	9474	18.0
1976	28703	20.4	11252	21.0
1977	26986	20.6	10114	19.6
1978	22862	21.1	10584	20.0
1979	25274	21.3	10488	16.4
1980	28783	21.3	11098	17.3
1981	32634	22.5	12427	19.9
1982	31539	23.5	12554	21.2
1983	24843	24.3	13697	19.4
1984	27085	23.3	13158	16.1
1985	26196	23.0	13688	17.4
14 Year Average	26467.0	21.7	11109.9	18.2
14 Year Standard Deviation	9337.2	7.3	3995.0	6.3
Coefficient of Variation	2.83	2.97	2.78	2.89

Source: International Wheat Council.

prairies. It is recommended by Agriculture Canada that approximately 60 lbs of Nitrogen be applied in Canada but on stubble land only 40-45 lbs. of Nitrogen is actually applied. The application of Nitrogen on summerfallow is highly variable. In the 1984/85 season, 891,050 tonnes of Nitrogen was sold in western Canada. The average application was therefore about 34 kg/ha, or 30.3 lbs/acre. The application of fertilizer in the United States is much closer to the recommended rates. Although difficult to measure, it appears as though Canadian wheat farmers apply about 75 percent of the amount of the fertilizer applied in the United States.

A major difference in cropping practices between Canada and the United States is the practice of summerfallowing in Canada. Fallowing is conducted in order to preserve soil moisture and control weeds. It has been recognized that the predominance of summerfallowing is seriously affecting the future productive capacity of Canadian prairie soils (Senate of Canada, 1984). Acres fallowed range from 20-25 percent of total arable land in the prairie provinces. The actual number of summerfallow acres are shown in Table 4. There has been a gradual reduction in summerfallow acres over the past 25 years. The large increase in fallowed acres in 1970 is attributable to the Lower Inventories for Tomorrow Program (LIFT), which paid farmers to set aside acres. There was an increase from 20.5 to 21.3 million acres in 1987 because of the dry conditions on the prairies and the poor financial returns from crop production. Despite pressures to change it is unlikely that fallowed acreage will decline much further in the foreseeable future.

Although the rates of herbicide application vary from region to region, the rates of application in Canada are similar to those in the United States. Of course, the practice of summerfallowing in Canada reduces the need for herbicide and therefore some Canadian farmers use very little chemical weed control. The chemical licensing laws differ between the United States and Canada and from time to time products are available in one country but not the other. Table 5 shows herbicide use

Table 4

Summerfallow Acreages in the Canadian Prairie Provinces

Year	Manitoba Acres ('000)	Saskatchewan Acres ('000)	Alberta Acres ('000)	Prairie Provinces Acres ('000)
1953	3,020	13,450	6,490	22,960
1954	3,230	14,650	7,750	25,630
1955	3,300	14,284	6,930	24,514
1956	2,828	14,194	7,091	24,113
1957	2,934	14,900	7,250	25,084
1958	3,219	15,800	7,380	26,399
1959	3,224	16,000	7,370	26,594
1960	3,393	16,100	7,400	26,893
1961	3,230	17,180	7,450	27,860
1962	3,165	17,081	7,450	27,696
1963	3,260	16,898	7,226	27,384
1964	2,880	16,815	6,865	26,560
1965	2,800	16,800	7,071	26,671
1966	2,669	15,896	6,659	25,224
1967	2,650	16,650	6,650	25,950
1968	2,710	16,950	7,000	26,660
1969	3,200	18,200	7,400	28,800
1970	4,000	24,000	8,900	36,900
1971	2,655	16,560	7,009	26,224
1972	2,900	18,500	7,600	29,000
1973	2,500	17,200	6,800	26,500
1974	2,700	17,800	7,300	27,800
1975	2,500	17,900	6,900	27,300
1976	2,300	17,800	6,500	26,600
1977	2,300	17,800	7,000	27,100
1978	2,000	17,000	6,300	25,300
1979	2,100	17,100	6,500	25,700
1980	2,200	17,600	6,100	25,900
1981	1,500	16,500	5,500	23,500
1982	1,450	16,300	5,250	23,000
1983	1,350	15,900	5,100	22,350
1984	1,000	14,800	5,000	20,800
1985	1,000	14,500	5,000	20,500
1986	1,250	14,000	5,250	20,500
1987	1,300	14,700	5,300	21,300

Source: Statistics Canada.

Table 5

Herbicide Use in Red Spring Wheat in Manitoba, 1981 to 1984

Herbicide	% of Total Acreage Treated 1981	1982	1983	1984
Avadex BW	10.37	7.84	6.53	5.60
Avadex BW + Treflan EC	21.48	21.29	17.71	13.17
Treflan EC	2.85	1.97	2.04	1.80
Afolan or Lorox	1.36	1.17	0.88	0.81
Avenge 200 C	3.69	3.86	6.13	10.65
Banvel	11.18	13.62	14.61	12.67
Blagal	0.41	0.35	0.20	0.34
Brominal M/Buctril M/Sabre	9.29	12.16	15.27	19.54
Carbyne 2 EC	1.21	0.63	0.64	0.33
DyVel	2.04	2.68	3.34	3.98
Estaprop	2.22	2.62	3.58	3.85
Glean	--	0.83	0.21	0.26
Hoe-Grass 284	16.64	21.34	21.27	20.19
Hoe Grass II	--	--	3.09	8.72
Kil-Mor	0.08	0.04	0.05	0.03
Lexone/Sencor	0.03	0.05	0.05	0.13
Mataven	3.40	2.17	2.45	2.65
MCPA	25.24	24.72	20.90	20.10
MCPAK	1.09	0.92	0.97	0.81
Pardner/Torch/ Torch DS	8.07	9.52	5.29	3.61
Stampede 360	1.34	0.56	0.71	0.76
Stampede CM	4.36	4.28	3.49	3.37
Target	0.56	0.73	0.92	1.23
Tordon 202 C	2.15	2.73	3.55	3.27
2,4-D	35.23	33.51	31.39	25.91
Untreated	7.00	4.41	5.25	5.20

Source: Manitoba Department of Agriculture.

in red spring wheat production in the province of Manitoba. It is evident from this table that Avadex, Banvel, Brominal, Hoe-Grass, MCPA and 2, 4-D are the most common chemicals used to control weeds in wheat. Nine-five percent of the wheat acreage was treated in 1984. However, since the production of wheat in Manitoba is more intensive than in Saskatchewan, this 95 percent treatment rate would not apply across the entire prairie region.

A large percentage of the Canadian wheat crop is swathed before it is harvested. This practice is more common in Canada than in the United States because of the cool climatic conditions which normally prevail during the Canadian harvest season. Swathing the wheat results in a more rapid ripening and drying of the grain. According to the 1981 Census, virtually every farm in western Canada had a swather in that year. The self-propelled swather is by far the most popular. The same Census data indicates there were about 125,000 grain combines in western Canada in 1981 and 71 percent of these were self-propelled.

As demonstrated below in this report (see Figure 4), Canada tends to store a larger percentage of its wheat crop than does the United States. A breakdown of where these stocks are held in the system is provided in Table 6. On average, over the 12 year 1976-1987 period, 35 percent of these stocks were held on-farm. Most farms have small bins which hold anywhere from 1500-5000 bushels. These bins are generally assembled from rolled steel sheets and they have either cement or wooden floors. The cold winters on the prairies facilitate wheat storage as there are few insect or rodent problems.

Both heated and unheated drying is used on prairie farms. The trend in recent years has been towards unheated air drying on individual bins (i.e. airation drying). However, heated drying is still very common in the northern parts of the wheat belt. The 1986 Census conducted by Statistics Canada reported a total of 15,973 grain dryers in the three western prairie provinces. Table 7 reports the type of energy used

Table 6

Canadian Wheat Stocks at July 31
--thousand of tonnes--

Year	On Farm		Primary Elevators		Interior Terminals		Transfer Elevators and Export Terminals		Total Wheat Stocks
1976	1580	(20%)	2896	(36%)	6	(0.07%)	2586	(32%)	8044
1977	7166	(54%)	2538	(19%)	7	(0.05%)	2517	(19%)	13324
1978	5280	(44%)	4019	(33%)	19	(0.16%)	1747	(14%)	12105
1979	9117	(61%)	3542	(24%)	6	(0.04%)	1542	(10%)	15015
1980	4218	(40%)	3579	(34%)	9	(0.08%)	1749	(16%)	10604
1981	1483	(18%)	3598	(43%)	4	(0.05%)	2159	(26%)	8315
1982	3605	(38%)	3605	(38%)	46	(0.48%)	2139	(22%)	9549
1983	2125	(21%)	4134	(42%)	9	(0.09%)	2328	(24%)	9913
1984	1740	(19%)	3247	(36%)	3	(0.03%)	2687	(30%)	8962
1985	970	(14%)	1577	(23%)	2	(0.03%)	3609	(52%)	6972
1986	700	(9%)	3399	(43%)	27	(0.34%)	2966	(38%)	7884
1987	4797	(42%)	2694	(24%)	5	(0.04%)	2880	(26%)	11288
12-Year Average	3565	(35%)	3236	(32%)	12	(0.12%)	2409	(24%)	10164

Note: Parentheses report % of total wheat stocks.

Source: Canada Grains Council.

Table 7

Energy Type Used to Dry Wheat on Prairie Farms, 1981

Principal Heat Source	Province Manitoba	 Saskatchewan	 Alberta
Fuel Oil	--	1%	--
LPG	83%	57%	77%
Natural Gas	--	--	14%
Solar	3%	--	--
Electricity	14%	27%	9%
Forced Air	--	15%	--
Other Fuels	--	--	--
Amount Dried ('000 tonnes)	176	221	67

Source: Statistics Canada, Agricultural Census 1981.

to dry wheat on prairie farms in 1981. A total of 464,000 tonnes was dried on the prairies in that year. The data in the table indicates the most common energy source is propane. Fourteen percent of the drying in the province of Alberta was done with Natural gas, which is readily available in that province. Electricity is also an important energy source, especially in the province of Saskatchewan.

c. Domestic Utilization

The domestic market absorbs about one-fourth of all Canadian wheat sales in any given year; the remainder being exported. Ninety-five percent of the Canadian wheat produced originates in western Canada and prairie farmers are much less dependent on the domestic market than are eastern Canadian wheat farmers.

On average, about 10 percent of Canadian production is milled at home, 10 percent is sold domestically as feed and 5 percent is used locally as seed. The market for domestic milling wheat has limited growth potential because the demand for flour and semolina has levelled off in Canada and exports of flour have fallen dramatically. Average flour exports over the 1977-81 period were 1.1 mmt, declining to an average of only .494 mmt over the 1981-85 time period. Canada has lost market share in the international flour market largely because of an increase in subsidized sales from the EEC and the United States.

The per capita consumption of wheat (for human food) in Canada stands at about 80 kg per year compared to 75 kg in the United States and 96 kg in the EC. These per capita consumption figures are gradually declining but a very slow rate of population growth acts as an offsetting force to maintain total consumption levels at a relatively constant level.

The amount of wheat milled in Canada by class is shown in Table 8. From this table we find that about 9.5 percent of the wheat produced on the prairies is milled in Canada. In comparison, over 28 percent of Ontario's wheat is milled

Table 8

Canadian Domestic Wheat Milling
1980/81 - 1984/85 Averages
(thousand tonnes)

Class	Annual Wheat Production	Annual Milling: Total	Annual Milling: For Exportation	Annual Milling: For Domestic Use	Milling As Percent of Production
CWRS	19,836	1,927	487	1,440	9.7
Durum	2,568	125	37	88	4.9
CWS White	560	127	--	127	22.7
CWR Winter	338	37	--	37	10.9
Total Prairie	23,302	2,216	524	1,692	9.5
Ontario Winter	669	190	17	173	28.4
Total	23,971	2,406	541	1,865	10.0

Source: Statistics Canada, unpublished data.

domestically. More importantly, Ontario's share of this domestic milling market has been increasing. This is due to: (a) its proximity to the location of the large mills and the population in eastern Canada; (b) its production of soft white wheats which are preferred for pastry flour; (c) its increasing production of hard red spring wheats which can be blended into bread flour grists; and (d) the millers preference for an alternative supply source to avoid dependence on the monopolistic CWB (which has the potential to price western wheat up to $11 per bushel under the revised 1986/87 two-price system). Given that Ontario wheat is becoming more and more acceptable to millers, the production of wheat has increased at a much faster rate in that province in comparison to the rest of Canada. Acreage in Ontario has almost doubled in the past 10 years although it exhibits considerable year-to-year variability. In future years, the production of wheat outside of the CWB designated area may continue to increase, particularly if the CWB continues to practice price discrimination by charging a higher price for domestic sales compared to export sales.

The production of hard spring wheat has also become a factor in eastern Canada. Data on spring versus winter acreage are not readily available but there is every indication that spring wheat production is on the increase in the province Ontario. At the present time, about 30,000 acres of spring wheat is grown in Ontario. This is less than one-half of the area grown in the province of Quebec and about equal to the area in the Maritimes (Hunt and Bulman). There is a real possibility that if the two-price system is left unchanged, eastern Canada may capture 50 percent or more of the domestic milling market provided the eastern produced hard wheat proves to be of suitable quality. The two-price system is discussed in more detail later under "marketing channels." As of December 1987 the two-price system is still operating even though the Canadian government has indicated it will most likely be eliminated in the future. This announcement was probably brought on by large production increases of milling wheat in eastern Canada, which is outside of the CWB's justification. The government announcement gave no details as to how or when the price discrimination system would be eliminated. However, it was stated that western farmers would be compensated for losses resulting from the elimination of this policy.

Unlike milling wheat, most of the feed wheat consumed on the prairies is either handled outside of the licensed elevator system or used on-farm. However, the subsidized freight rate structure encourages the movement of feed grains off the prairies. Demand for wheat for animal feed in western Canada remains fairly constant at 2 to 2.5 mmt per annum, and demonstrates little response to changes in prices. The feeding of wheat in the United States is much more responsive to market conditions, with the price of wheat relative to corn acting as a major determinant of feed wheat usage. For example, in 1983-84 the use of wheat as livestock feed nearly doubled in the United States as the relative price of corn rose rather dramatically. The feed usage of wheat remained high in the United States in 1984/85, at approximately 11.2 mmt (35 percent of total use) but then declined to 7.7 mmt in 1985/86. As a percentage of total use, domestic feed usage is normally quite high in Canada (about 40 percent of total domestic use) compared to the United States. In Canada, the share of wheat in total domestic feedgrains is also relatively high, at around 12 percent per annum. For the United States this figure averages only 4-5 percent. The feed market offers the most potential for increased wheat demand in Canada but given the relatively high feeding rates for wheat now and the introduction of higher yielding dwarf barley varieties, the volume of wheat used for feed is not expected to increase dramatically. Sales for feed wheat from the prairies to eastern Canada have been falling off because of increased corn production in Ontario and Quebec. A significant shift in the location of livestock production in response to changes in transportation rates on grains would alter this situation but this is not likely to occur.

The domestic feed grain market has been analyzed in depth by the Canada Grains Council in their report, "The Structure of the Feed Grain Market in Western Canada." They studied the three major markets for prairie feed grains: (a) the feed market in western Canada; (2) the feed market in eastern Canada; and (3) the export market. During the 1974 to 1983 time period the feed market in western Canada showed no signs of growth, the demand from the eastern Canadian market declined, and the export market grew slowly.

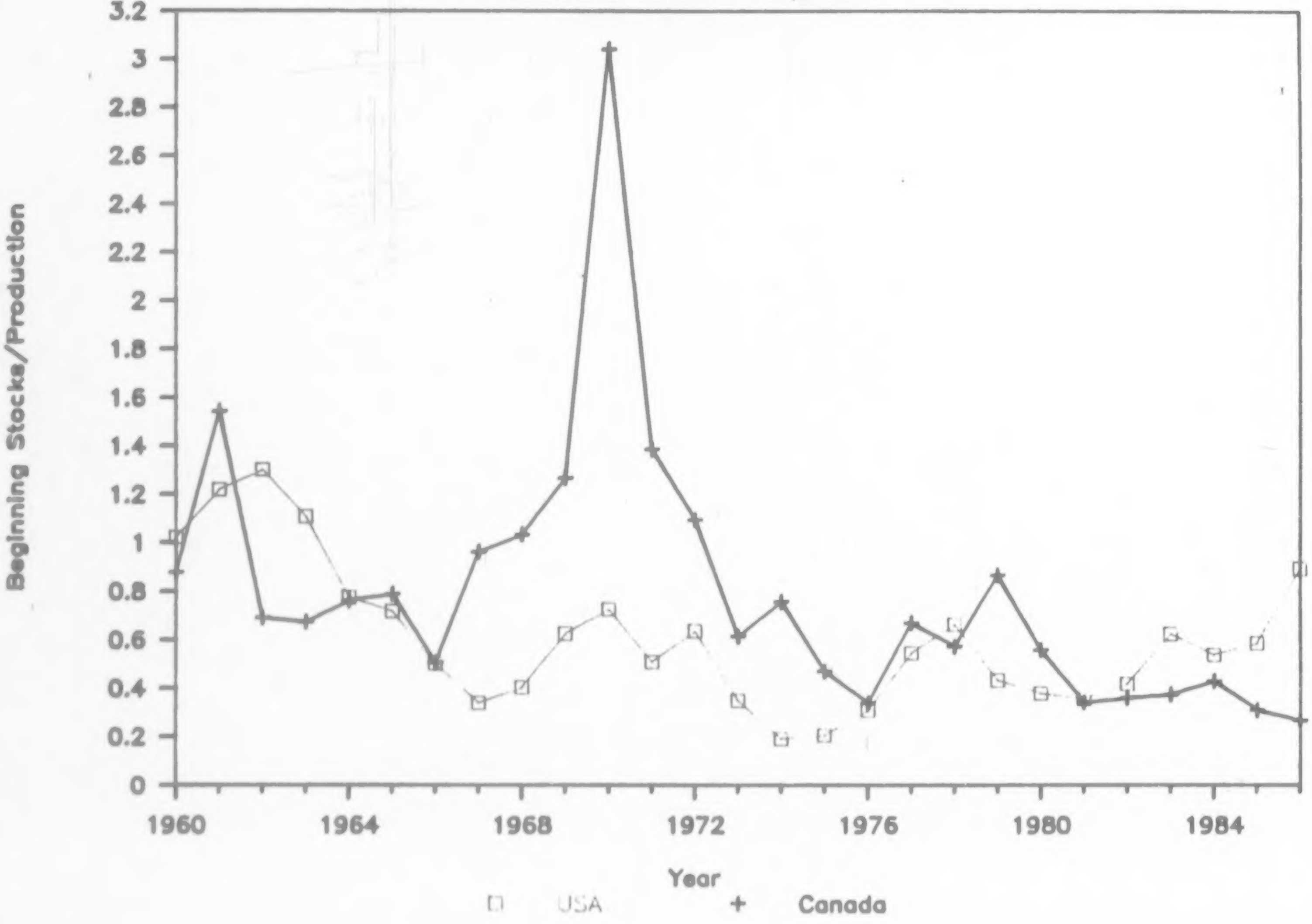
Although wheat stocks fluctuate considerably from year to year, they averaged close to 13 mmt from the 1960 to 1986 period. This represents about 80 percent of production. The stocks-to-production ratio in Canada is higher than is the case for the United States where the ratio was 60 percent of production over this period. The historical patterns are shown in Figure 4. Furthermore, the Canadian stocks are largely held by farmers (or farmer-owned grain cooperatives) while in the United States the government carries a large amount of stocks.

The stocks to production ratio in Figure 4 increased dramatically in Canada in 1970 to 3.04. This was a result of the Lower Inventories for Tomorrow (LIFT) program which paid farmers to set aside acreage and which art production from 18 to 9 mmt. If 1970 is excluded from the data in Figure 3, the Canadian mean ratio for the 1960-86 period falls from 0.8 to 0.71, which still places it above the United States figure of 0.6. From Figure 4 it can be seen that the United States ratio has been above that for Canada for the recent past (1981-86). The U.S. ratio increased to 0.9 in 1986, compared to a relatively low 0.27 for Canada. In addition to stockholding, an additional function which is largely carried out by farmers is grain drying (Leibfried). In some years, a considerable amount of harvested wheat in the black and gray wooded soil zone (see Figure 1) may be harvested damp. Farmers either dry the

FIGURE 4

Stocks/Production Ratio

USA and Canada 1960/1984



grain with dryers or airation bins on the farm. This is often a necessity because farmers store the grain themselves. The quality of grain usually does not suffer if the drying is done properly.

d. International Trade

Canada has historically been the second largest exporter of wheat, with a market share ranging between 18 and 26 percent over the past fifteen years. Wheat exports from Canada were shown in Table 1. The other major exporters are the United States, EC, Australia and Argentina. The United States and Canada account for over 60 percent of the wheat trade. Several different categories of wheat are traded internationally but Canada specializes in high quality wheat and durum wheat. Canada's ability to compete in the international market is enhanced by the fact it offers a high quality uniform product. High quality wheat (No. 1 and No. 2 CWRS) represent over one-half of Canadian exports, whereas medium quality wheats account for almost two-thirds of U.S. exports. Table 9 reports Canadian wheat exports by grade over the 1981 to 1987 time period. No. 1 CWRS is by far the dominant grade exported as it accounts for 45 percent of exports on average. The major importers of these high quality wheats from Canada have been, in order of importance: Japan, the United Kingdom, USSR, China, Cuba and Brazil. Other than China, the USSR and Brazil, these countries do not buy medium quality wheats from Canada. Table 10 reports the destinations (in percentage terms) for Canadian wheat shipments from 1970 to 1986. The largest customers are the USSR, China, Japan, Brazil and the U.K.

The high quality wheat market has been growing very slowly compared to that in medium quality wheats. Improvements in baking techniques worldwide permits flour of lower protein content to be used without sacrificing bread quality, which in turn reduces the need for high quality Canadian wheat in blends.

Table 9

Canadian Wheat Exports by Grade
1981/1987

	Year						Average
Grades	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1981-1986
No. 1 CWRS	54.2	46.0	45.3	63.5	38.6	22.7	45.1
No. 2 CWRS	12.5	13.1	13.0	4.8	15.7	13.2	12.0
No. 3 CWRS	12.7	15.9	17.9	11.4	21.4	27.6	17.8
Durum	12.9	12.8	12.0	10.7	8.0	9.6	11.0
Feed	1.0	3.0	0.6	1.0	8.3	19.8	5.6
Others	6.7	9.2	11.2	8.6	8.0	7.1	8.5

Source: Canadian Grain Commission Exports of Canadian Grain and Wheat Flour (various issues).

Table 10

Share of Canadian Wheat Exports by Country

Crop Year	Brazil	China	Egypt	India	Italy	Japan	United Kingdom	USSR	West Germany	Others
					percent					
1970/71	2.9	20.3	4.1	6.0	2.8	8.6	13.4	4.2	3.4	34.3
1971/72	2.6	20.8	0.6	4.5	3.7	10.1	10.3	19.4	1.7	26.3
1972/73	2.3	28.0	0.2	2.8	2.3	8.7	8.0	26.7	1.6	19.4
1973/74	6.8	11.8	-.--	3.0	5.9	14.4	10.2	13.6	2.8	31.5
1974/75	8.8	21.2	-.--	4.5	5.2	10.6	14.4	2.8	0.8	31.7
1975/76	4.3	9.9	-.--	3.9	5.6	13.2	10.0	26.0	1.0	26.1
1976/77	7.6	14.9	1.7	1.1	3.9	10.2	10.2	9.3	2.6	38.5
1977/78	5.4	20.9	3.4	-.--	5.9	8.5	10.1	10.6	0.4	34.8
1978/79	7.8	23.5	1.2	-.--	3.0	9.1	9.8	14.0	0.1	30.7
1979/80	6.9	17.6	0.2	-.--	4.6	8.6	9.2	13.7	-.--	39.2
1980/81	8.3	16.9	0.1	0.2	5.1	8.5	7.8	25.5	-.--	27.7
1981/82	7.3	17.3	1.8	0.5	2.9	7.6	7.6	28.0	0.1	27.1
1982/83	7.2	21.1	0.1	-.--	3.0	6.4	5.3	33.2	-.--	23.7
1983/84	6.4	16.1	3.1	2.4	3.5	6.2	4.5	31.8	0.1	25.9
1984/85	6.7	16.3	2.6	-.--	1.3	7.7	3.7	35.3	-.--	26.4
1985/86	5.7	14.8	2.7	-.--	2.1	7.3	4.0	30.1	-.--	33.3

Source: Canada Grains Council, Wheat Grades for Canada, p. 77 (for 1970/71 - 1980/81).

Canadian Wheat Board, Annual Report, 1984/85, Table XII, pp. 9 and 10 (for 1981/82 - 1984/85).

Global trade in wheat increased from 54 mmt in 1970 to over 100 mmt in 1985. Large gains were made in the 1970s as in that decade the grain trade grew approximately twice as fast as world production. Canada's wheat exports grew by about 30 percent. There was also an important distributional shift in the pattern of the world wheat trade. Wheat imports by the developed countries stagnated and the centrally planned economies (CPE's) increased their purchasesdramatically (Table 11). The CWB established a firm position in this market as it now exports more than 50 percent of its wheat to Communist bloc countries. During the 1970s Canada sold about 20 percent of its wheat to western Europe and this declined to 10 percent in the early 1980s largely as a result of decreased sales to the U.K. Sales to Japan as a percentage of total Canadian exports have also become less important. The markets in E. Europe, Russia, and Latin America have increased in importance. The sales strategies of the CWB have also changed over the last fifteen years. In the 1960s most of the Canadian wheat sales were made to multinational grain companies who in turn sold to the importer. In the 1970s the CWB moved away from this technique and began dealing directly with the importer. This of course was facilitated by growing importance of the CPE's in the market and their use of state trading agencies to import grains. The multinational companies now only play a limited role in marketing Canadian wheat as the CWB deals directly with the customer in most cases. Although the international trade in feed wheat is relatively small, Canada is a major exporter along the EC and Australia. The USSR is the largest feeder of wheat in the world and in 1986/87 about 25 percent of its wheat imports (approximately 4 mmt) was of feed quality. This was supplied primarily by Canada and the EC.

Canada is the third largest contributor of world Food Aid. Of the wheat and flour exported each year from Canada approximately 4 percent (over 700,000 tonnes) is exported under a food aid program. Approximately 50 percent is donated under

Table 11

Global Wheat Imports by Region

Year	Developed Countries		Centrally-Planned Countries		Developing Countries		Total
	million tons						
1969/70	14.6	(29%)	12.4	(24%)	23.7	(24%)	50.7
1974/75	11.8	(19%)	14.1	(22%)	37.5	(59%)	63.4
1979/80	13.8	(16%)	28.2	(33%)	44.0	(51%)	86.0
1984/85	12.2	(12%)	39.5	(38%)	52.7	(50%)	104.4

Source: IWC, World Wheat Statistics, 1986.

bilateral programs and the remainder is distributed through the World Food Program.

In the early 1970s Canadian exports of flour were about 5 percent of wheat exports and this has fallen to less than 2.5 percent. In wheat equivalents, flour exports fell from 700,000 to 450,000 tonnes in this fifteen year period. Commercial markets for Canadian flour have disappeared (e.g. the U.K.) and almost all of Canada's flour exports are now in the form of food aid shipments.

II. Marketing and Government Regulation

a. Marketing Channels

There are three major marketing channels through which Canadian grains flow. They are the Canadian Wheat Board (CWB), the dual CWB-open market system, and the open market. Since there is an intricate mixture of government agencies, farmer cooperatives, and private companies involved in marketing Canadian grain, it is a very complicated system. For example, canola is handled by the private trade and there is an active futures market but at the same time the CWB regulates producer sales of canola through delivery quotas. This means the future market does not operate as efficiently as it would without government interference.

The CWB is a government agency and it is basically a sales agency as it owns no physical facilities for the handling of grain. It employs the services of both private and cooperative elevator companies to carry out the logistics of physically handling the grain. Even though it is a government agency the CWB's responsibility is to bring the highest possible returns to producers and give them equitable access to the export market. Consumer welfare is not an overriding concern of the CWB.

The CWB is the world's largest single grain marketing agency. It is comprised of between three and five commissioners, who are appointed by the government.

They have a staff of about 525. The commissioners periodically seek advice from an advisory committee elected by farmers, but the advisory has no real control over the commissioners. Unlike the Australian Wheat Board, the Canadian Board is not directly responsible to producers. Rather, it answers to the federal government.

Most of the wheat produced in western Canada is marketed through the CWB since it has monopoly rights over all wheat exports and all domestic sales for human consumption. Approximately 95 percent of the wheat production enters the primary elevator system and the remainder is used on-farm for feed or seed or sold locally. Of the wheat which does enter the elevator system, 97 percent of it is delivered to the CWB and 3 percent is delivered to the private trade. The private trade is only permitted to buy feed wheat, which they subsequently sell on the Winnipeg cash and futures market. The CWB does not trade on the futures market, unlike the Australian Wheat Board. The wheat grown in Ontario is sold through the Ontario Wheat Producers' Marketing Board, which is a much smaller provincial agency.

At the beginning of each crop year (August 1st), the government of Canada establishes initial producer prices for grain sold to the CWB. These prices are announced in advance, normally in April to allow farmers to adjust their seeding intentions. There are separate prices established for each grade of wheat. Receipts from CWB sales into the domestic and export market are then "pooled". Producers receive the initial payment at the time of delivery. In some years they receive an interim payment during the crop year (if prices strengthen considerably) and then a final payment once the crop year is over. At this point in time, the pool is closed and the CWB deducts its administrative expenses, interest costs, etc., from the pool. Each producer receives the same price (before freight deductions) no matter what date the wheat was sold to the CWB within a particular crop year. The CWB has separate "pools" for hard red spring wheat and durum.

When selling to the CWB, producers' marketing costs are deducted in two stages. Freight costs and primary elevator handling costs are deducted from the initial payment at the time of delivery. The other costs which include interest, insurance, storage, etc. and the Board's operating costs are later charged against the "pool" before the final payment is advanced to the farmers.

Domestic sales of wheat by the CWB to millers takes place at prices that are partially insulated from world levels. This is referred to as the two-price wheat policy, and it was established in 1967. During the 1970s the Canadian government fixed the domestic price to mills at relatively low levels and thus subsidized consumers (assuming the millers and bakers passed this saving on) when world prices were above these levels. The two-price policy has been very controversial over the years and it has gone through a number of changes. Currently the domestic price is allowed to vary within a price band of $255 to $330 per tonnes and the government is no longer involved in subsidizing either producers or consumers if the world price falls outside of this range. As of December 1987 the CWB was changing the minimum price of $255. Since its inception, producer gains from the two-price program have roughly offset their losses. Consumers have received benefits of close to $500 million, which have come at the government's cost.

b. Government Regulation

The Canadian grain market is heavily regulated beyond the CWB. Some of these regulations have developed to provide equity to producers, some to facilitate ease of marketing and some to appease interest groups. The major regulations include grain freight rates, producer delivery quotas, rail car allocation, varietal licensing, and grading.

The wheat produced in western Canada must be moved over vast distances to reach a sea port. Most the grain is moved to port by rail rather than by truck or barge. The farmers delivery their grain to primary elevators which are located on rail lines. The rail freight rates are regulated by the government and they have not changed much in the last ninety years. Prior to the turn of the century the federal government entered into an agreement with the Canadian Pacific Railway to fix the rates and in return the railway received a subsidy (this was the Crow's Nest Pass agreement). These rates were generally considered adequate to provide a return to the railways until the inflationary period of the 1960s and 1970s (Gilson). With inflation, the rates were inadequate and therefore the railways discontinued investment in the transportation system which rapidly deteriorated. Farm stocks of wheat were high (see Figure 4) and the CWB could not move as much grain as there were sales for. After much study and negotiation the federal government has increased its subsidy to the railways and farmers are now paying a larger portion of shipping costs. Variable freight rates (e.g. discount for unit trains) are now being used more and more extensively. As a result, the Canadian grain transportation bottlenecks have almost been removed.

Producer delivery quotas are another important aspect of regulations in the Canadian wheat industry. The CWB regulates producer deliveries to primary elevators through quotas. These quotas have been in place since 1940 and their original purpose was to provide equitable access to markets for all producers. In the 1950s the quotas were used as an instrument to ration the storage space in primary elevators. Then in the 1960s and 1970s the sales strategies of the CWB and the capacity of the transportation system began to influence quota levels and justify the continuation of the quota system.

The entire quota system is currently under review. Some farmers believe the system is inequitable because each wheat farmer is assigned a base acreage whether his land is seeded or not and quotas are announced by the CWB as a fixed number of bushels per assigned acre. No allowance is made for varying yields across the prairies, not even for irrigated land. On the other hand, farmers in southern Saskatchewan who normally benefit from the current quota system argue that the price poling system is inequitable from their vantage point. Some of these farmers brought a lawsuit against the CWB in 1987 because CWB allegedly subsidized the price of No. 2 and No. 3 CWRS wheat with higher prices fetched for No. 1 CWRS.

The government regulatory agency which is responsible for the quality control of Canadian grain and for the supervision of its handling is the Canadian Grain Commission. Among the most important of its functions are the inspection and grading of grain. The official inspection of grain is done on a visual basis and any new variety licensed for sale must be visually distinguishable from any existing variety and it must have high milling and baking characteristics. Canadian regulators have historically stressed the quality aspect of Canadian wheat and this has brought Canada the reputation of supplying good wheat but it has come at a cost in terms of lower yields. Many of the semi-dwarf spring wheats which are grown in the United States are higher yielding than Canadian varieties but since most of them are not visually distinguishable from existing Canadian varieties they are not licensed. Some farmers "smuggled" seed into Canada in the early 1980s and started growing those wheats and selling them as "unprescribed" varieties. This meant they were sold for feed prices. Most of these varieties were not visually distinguishable from CWRS varieties and there was a fear of possible mixing into CWRS grades. However the Canadian Grain Commission found the contamination of CWRS grades with unlicensed varieties to be a contamination of CWRS grades with unlicensed varieties to be a problem of minimal proportion (Report of the Committee on unprescribed varieties). It has been estimated that the economic costs of this regulation are high and between 5 and 17 percent of annual net farm income in Canada (Carter, Loyns and Ahmadi-Esfahani).

By 1985 there was approximately 500,000 acres of wheat seeded to unprescribed varieties (Committee on Unprescribed Varieties). The Census figures for 1986 indicate there was close to 600,000 acres in that year. In response to farmers' desire to produce semi-dwarf wheats, the Canadian government followed the advice of the Committee on Unprescribed Varieties and licensed Oslo wheat in 1987. Oslo is visually distinguishable from Neepawa and it has become eligible for the newly established "Prairie Spring" grade.

The relationship between the grading system and the operational efficiency of Vancouver terminal elevators was studied by McKeague et al. Aspects of operational efficiency which were examined included railcar unloading, weighing, grading, cleaning, storage and shipping. The authors found that if grain was pre-graded before arriving at the terminals there would be an increase in throughput. In addition, they determined that a reduction in the number of wheat grades and a reduction in the difference between primary and export standards would lead to cost reductions.

c. Terminal Elevator Technologies

Table 12 reports handlings of wheat at Canadian Terminal elevators during the 1986/87 crop year. It is clear from this table that the Interior Terminals are relatively unimportant in the overall grain marketing system. Farmers by-pass the interior terminals in order to avoid the payment of handling and elevation charges at the interior terminal (approximately $12 per tonne) and then again at the export terminal. The Canadian system is not designed to rail wheat directly from the interior terminals to an export vessel. The inland terminals have the capability to clean grain to export standards but so far this has not been taken advantage of.

Table 12

Handlings of Wheat at Canadian Terminal Elevators: 1986/87 Crop Year
--'000 Tonnes--

Receipts at Terminal	Wheat
Thunder Bay	9,529.9
Vancouver	6,358.8
Prince Rupert	3,183.4
Churchill	--
Interior Terminals	41.9
Total	19,113.9

Source: Canadian Grain Commission.

As shown above in Table 6 the interior terminals normally hold less than 1 percent of the carryover wheat stocks. These elevators have a combined storage capacity of approximately 154,000 tonnes which is left largely unutilized. However, during the Thunder Bay worker's strike in the fall of 1986 the Canadian Wheat Board railed clean grain directly from the inland elevators to transfer elevators on the St. Lawrence. This program demonstrated the feasibility of cleaning inland on an ongoing basis if necessary.

The amount of wheat dried at inland terminals totalled 3,934 tonnes in the 1986/87 crop year. This data is reported in Table 13. The amount dried inland was higher than normal because of the Thunder Bay dock strike that season. The total amount dried at all terminal elevators represented less than 3 percent of the total amount handled, which is the norm.

The export terminals are clearly an important component of the Canadian grain handling system. The total capacity of each Terminal is shown in Table 14. From Table 14 we find there are 12 elevators in Thunder Bay with a total storage capacity of 2,076,690 tonnes. The Churchill elevator is owned and operated by the Canadian government and it has a capacity of 140,000 tonnes. On the Pacific coast there are six elevators with a total capacity of 1,138,800. Prince Rupert has the newest facility and it handled over 4 million tonnes in 1986/87. For 1987/88 the Prince Rupert handlings are expected to reach 5 million tonnes and there is the potential to handle upwards to 6 million tonnes. The Vancouver terminals handled 11.9 million tonnes in 1986/87 and for 1987/88 the figure is expected to be close to 13 million tonnes (Larson). With further improvements in efficiency the throughput capacity at Vancouver could be increased to 16.5 million tonnes per year (Larson). As pointed out by Leibfried, the increased use of unit trains could greatly increase the throughput at Vancouver.

Table 13

Wheat Dried at Terminal Elevators,1986/87
--Tonnes--

Location	Artificial Drying	Natural Drying	Total
Inland Terminals	3,443	491	3,934
Thunder Bay	494,839	362,077	856,916
Pacific Coast	381,731	322,626	704,357

Table 14

Licensed Terminal Elevator Capacities
at August 1, 1987

Location	Railway	Licensee	No. of Elevators	Cap./ Tonnes
Ontario				
Thunder Bay	C.N.	Cargill Limited		176,020
	C.P.-C.N.	Manitoba Pool Elevators No. 1		167,460
	C.N.	Manitoba Pool Elevators No. 3		215,540
	C.P.	Parrish & Heimbecker, Limited		40,800
	C.P.	Richardson Terminals Limited		210,030
	C.P.-C.N.	Saskatchewan Wheat Pool No. 4		223,180
	C.N.	Saskatchewan Wheat Pool No. 6		169,140
	C.N.	Saskatchewan Wheat Pool No. 7		362,650
	C.P.	Saskatchewan Wheat Pool No. 8		70,160
	C.N.	Saskatchewan Wheat Pool No. 15		119,670
	C.N.	United Grain Growers Limited "A"		231,030
	C.P.	United Grain Growers Limited "M"		91,010
			12	2,076,690
Manitoba				
Churchill	C.N.	Canada Ports Corporation		140,020
Winnipeg	C.P.-C.N.	Elders Grain Company Ltd. "W"		37,880
	C.N.	Elders Grain Company Ltd. "S"		19,200
			3	197,100
Saskatchewan				
Moose Jaw	C.P.-C.N.	Elders Grain Company Ltd.		154,020
Saskatoon	C.P.-C.N.	Northern Sales Co. Ltd.		154,020
			2	308,040
British Columbia				
North Vancouver	C.N.	Pioneer Grain Terminal Limited		108,000
	C.N.	Saskatchewan Wheat Pool		237,240
Prince Rupert	C.N.	Prince Rupert Grain Ltd.		209,510
Vancouver	C.P.	Alberta Wheat Pool		282,830
	C.N.-C.P.	Pacific Elevators Limited		199,150
	C.N.-C.P.	United Grain Growers Limited		102,070
			6	1,138,800
TOTAL			23	3,720,630

Source: Canadian Grain Commission

Compared to Thunder Bay, Vancouver has limited storage capacity and this constrains its ability to handle more exports. The Vancouver Port has only 930,000 tonnes of storage available and in 1987 storage turned over 14 times. In contrast, Thunder Bay turnover of storage was only about 7.5 times in 1986/87.

The dryers used in the Terminal elevators are generally fed by belts and use gravity to move wheat through the heated units. Natural gas and propane are common energy sources. Terminal elevators in western Canada which are equipped with machinery for artificial drying are listed in Table 15. Drying capacity is a constraint to the operation of most Terminal elevators in those years when damp grain is common. In a normal year only about 5 percent of the wheat handled in these facilities requires drying and this requirement is easily handled.

Vertical cements bins are used for storage in almost all of the Terminal elevators in western Canada. Cargill grain has a flat storage bin in Thunder Bay but its storage capacity is minimal. Some of the transfer elevators in eastern Canada use steel tanks for storage. However, it is important to note that these transfer elevators do not "process" grain. Vertical cement bins are common at the Terminals because the Canadian Grain Commission does not allow blending and thus there is a significant number of grades which must be kept separate. This is the reason that unit trains with only one grain/one grade would greatly enhance the efficiency of the Terminals. For wheat alone as many as 10 different grade separations may be required. Consequently, the Canadian Terminals have a large number of "small" storage bins. For example, one facility in Vancouver has over 100,000 tonne storage capacity and this is divided into about 120 different bins. Since there are no restrictions on blending in the United States and fewer grades of wheat, horizontal storage is more common. Horizontal storage is less costly than vertical storage.

Table 15

Terminal Elevators in the Western Division Which are Equipped With Machinery for the Drying of Grain

As at August 1, 1987

Location	Elevators	Capacity of Heater Section --tonnes--
Manitoba		
Winnipeg	Elders Grain Company Ltd. "W"	22
		22
Saskatchewan		
Moose Jaw	Elders Grain Company Ltd.	21
Saskatoon	Northern Sales Co. Ltd.	70
		91
British Columbia		
North Vancouver	Pioneer Grain Terminal Limited	71
Prince Rupert	Prince Rupert Grain Ltd.	75
	Saskatchewan Wheat Pool	60
Vancouver	Alberta Wheat Pool	56
	Pacific Elevators Limited	42
	United Grain Growers Limited	22
		326
Ontario		
Thunder Bay	Cargill Limited	50
	Manitoba Pool Elevators No. 1	28
	Manitoba Pool Elevators No. 3	40
	Parrish & Heimbecker, Limited	13
	Richardson Terminals Limited	44
	Saskatchewan Wheat Pool No.4	74
	Saskatchewan Wheat Pool No. 6	70
	Saskatchewan Wheat Pool No. 7	53
	Saskatchewan Wheat Pool No. 8	8
	Saskatchewan Wheat Pool No. 15	42
	United Grain Growers Limited "A"	22
	United Grain Growers LImited "M"	23
		467
TOTAL		906

Note: Heater capacity based on wheat.

Source: Canadian Grain Commission.

As with the drying equipment, the cleaning equipment used in the various terminals is very similar from facility to facility. Most terminals carry out "single pass" cleaning which means the grain does not have to be elevated more than once. Generally speaking, the terminal operators try and clean the grain as they receive it rather than putting uncleaned grain into storage. This is especially true in Vancouver where the storage capacity is much more limiting. The majority of the cleaning of prairie grain takes place at the Terminals since there is limited cleaning conducted on-farm or at primary elevators.

Belt conveyors are the predominant mechanisms used to transfer grain within a Terminal elevator in Canada. Many of the Terminal elevators were built in the 1915-1925 time period but since then new annexes have been added and new equipment has been installed. The installation of new equipment is an ongoing process. For example, the five terminals in Vancouver plan to spend about $100 million on capital equipment over the next few years.

d. New Varieties[1]

The maintenance of quality standards in the Canadian system begins at the farm level. The Canada Seeds Act requires that a new variety of wheat be extensively tested before it can be issued a license by the Minister of Agriculture for sale as seed. The Seeds Act dramatically reduces the number of varieties released and thus limits the varietal options available to farmers. From 1923 to 1986, only 34 new CWRS varieties were released in Canada (Leisle). This is roughly one new variety every two years. In contrast, in the early 1980s, 33 new varieties were released in North Dakota over a five year period (Leisle), or an average of over 6.5 new varieties each year.

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[1] This section on new varieties draws heavily from the report by Prairie Horizons.

The chosen new varieties are compared in controlled experiments to Neepawa, the statutory standard, and to several existing varieties at numerous locations across the prairies. Trials are replicated four times at each location to enhance statistical reliability. Evaluation for disease resistance is most extensive at this stage. Each year's data is reviewed by three Expert Committees (on grain breeding, grain diseases and grain quality). An entry may be rejected from the test and thus from licensing consideration by any one Committee at any stage. Varieties may remain in the Co-operative Test for three years. If, at that point, all three Committees recommend that a variety be licensed, the plant breeder submits an application to the Plant Products and Quarantine Directorate of Agriculture Canada. A license may then be issued under authority of the Federal Minister of Agriculture.

The three Expert Committees play an extremely important role in this process as each Committee effectively has veto power over the licensing decision. Similarly, approval from each of the three Committees essentially ensures that a variety will be licensed. The justification for vesting this level of control in the Committee structure is that that Committees are made up of foremost experts in each field.

The Expert Committee on Grain Breeding, for instance, consists largely of plant breeders and geneticists who review results on agronomic characteristics such as yield, time to maturity, resistance to lodging, height, etc.

The Expert Committee on Grain Diseases consists mainly of plant pathologists who concern themselves with the degree of disease resistance shown.

The Expert Committee on Grain Quality is the most diverse of the three groups. Membership consists of cereal chemists, marketing experts (from the Canadian Wheat Board and the Canadian International Grains Institute), the Chief Grain Inspector of the Canadian Grain Commission, and users of the end product (milling companies). Such a broad cross-section of participants might well be expected to lead to disagreements over the merit of proposed new varieties. However, potential conflicts are limited by the strict definition of "quality" which the Committee must apply as specified by the Canada Grain Act.

Generally, new varieties of wheat must make a positive contribution to existing varietal stock. This improvement must be in concert with Canada's reputation for exporting high quality wheat. New varieties must, therefore, conform to a number of fixed criteria that effectively serve to define "quality" as it applies to licensing of varieties. The source of these standards is the Canada Grain Act, specifically, the schedule of official grades set out in the Act. In order for a new variety of wheat to comply with the quality criteria it must meet two basic requirements.

First, it must be equal in quality to the standard variety for the class of wheat into which it will be licensed. For example, if a new variety of Hard Red Spring wheat fulfills the grading requirements of the Canada Western Red Spring (CWRS) wheat class, it must have milling and baking qualities equal to those of the Neepawa variety.

Testing for quality (relative to the standard variety) is conducted largely by Agriculture Canada at the A and B test levels and by the Grain Research Laboratory of the Canadian Grain Commission during the Co-operative Test phase. Samples are assessed for quality at each stage in the breeding program but the most comprehensive testing is conducted during the Co-operative Test phase. New varieties are tested against minimum standards based upon the standard variety for the class. Characteristics tested include protein content, gluten strength, flour yield, flour appearance, kernel weight, kernel hardness and overall baking quality which includes flour properties, rheological dough properties and baking results. If the proposed variety fails to match consistently or surpass any of the "quality" standards, the Committee on Grain Quality must reject the variety from consideration for licensing in that class. Consequently, no variety can be licensed into a given class unless it meets all the milling and baking quality criteria regardless of agronomic merit.

If a new variety is not equal in quality to the standard variety, it may be licensed into another different class, providing its kernels can be distinguished from the standard variety of the higher quality class by visual means. This visual distinguishability criterion was applied in the case of Glenlea wheat, a high yielding but lower protein feed wheat which was licensed into the Canada Utility class. If the different quality variety is not visually distinguishable from the grain of an existing class, it cannot be licensed into any class. Visual distinguishability thus becomes a grading factor for wheats that do not match the milling and baking characteristics of the standard variety. In the context of this report, "quality" covers the spectrum from low (useful for feed) to high (primarily useful for pan breads and to upgrade local grists). The production of high "quality" wheat versus low "quality" wheat is dependent on variety and on geographical, climatic and management conditions.

As a result of these stringent licensing regulations Canadian wheat is very uniform. On average, over one-third of western Canadian wheat production achieves the top grade category of No. 1 CWRS (see Table 16). Similarly, about 27 percent grades No. 2 and the remaining 37 percent No. 3 or lower.

e. Prices

Wheat prices rose dramatically in the 1973/74 crop year as can be seen in Table 17 which reveals prices received by major exporters in the 1970-84 time period. While dropping off somewhat during the mid and late seventies, prices again peaked in 1981. Since then prices have continued to decline. A key factor in the downward trend in wheat prices is increased yields. In the 1960s yields grew by approximately 2.5 percent per annum, while slowing to an average of 2.2 percent per annum in the 1970s. Growth in the 1980s has averaged 3.6 percent thus far, largely because of

Table 16

Grade Distribution of Canadian Wheat Production, 1977-1985

Grade	1977	1978	1979	1980	1981	1982	1983	1984	1985	Average 1977/1985
	Percentage									
No. 1 CWRS	21	30	41	19	47	25	56	67	20	36
No. 2 CWRS	22	32	24	31	36	26	21	19	32	27
No. 3 CWRS	37	27	23	42	15	28	20	8	34	26
Utility/Feed	19	11	12	8	2	21	3	6	14	11

Source: Canadian Wheat Board, Annual Report (various issues), Winnipeg, Manitoba.

Table 17

Average Export Prices

Year	Argentina	Australia	Canada	France	United States
1970	54.69	54.90	61.30	75.93	58.02
1971	59.81	53.43	64.01	91.44	61.94
1972	66.78	58.14	67.09	89.80	64.25
1973	92.16	65.85	98.94	127.80	108.10
1974	176.69	148.74	205.95	149.64	176.53
1975	171.03	187.31	177.79	148.29	166.70
1976	136.78	153.73	163.99	154.38	146.21
1977	96.09	125.20	119.45	177.77	113.30
1978	108.31	104.17	116.23	203.23	127.13
1979	141.63	132.22	159.18	203.91	157.71
1980	170.04	163.01	182.21	213.41	178.31
1981	184.94	190.29	200.65	183.88	178.64
1982	177.91	174.14	180.98	165.04	164.74
1983	144.76	156.92	172.84	153.67	162.10
1984	133.30	155.99	172.92	153.61	153.33
1985	118.25	141.48	162.87	138.76	145.19
1986	100.50	129.01	127.96	165.95	122.59

Source: Canada Grains Council, Wheat Grades for Canada: Maintaining Excellence, p. 119 (for calculations 1970-80).

FAO, Trade Yearbook, 1982 and 1984, Table 38, p. 115 (for calculations 1981-84).

achievements in the developing countries of China, India and Argentina in particular. Yields have also noticeably improved in the EEC, and the USA (refer to Figure 3). The upward trend in yields can be expected to continue while input prices remain relatively stable.

Table 18 shows that import prices (basis c&f Japan) for premium Canadian wheat (No. 1 CWRS 13.5 percent) dropped approximately 20 percent from $264 to $212 per ton between 1980/81 and 1984/85, with prices for other classes of wheat showing similar declines. Table 19 shows average annual export prices by exporting country as a proportion of world price. The premium received for CWRS wheat has held its own, while the discount on U.S. hard red winter wheat has increased. This evidence seems contrary to the conventional wisdom in existence in the early 1980s that the spread between Canadian and U.S. wheat was narrowing.[1] The Canadian price premium spiked up in 1974, 1976 and 1981 when there was a temporary shortage of high protein wheat. However, another reason the Canadian CWRS wheat appears to have been maintained is that the quality (with uniformity as the key factor) of U.S. wheat has been declining in the eyes of some importers. This has allowed the CWB to continue to charge a premium for the reputation Canada has developed for selling wheat with a uniform, predictable quality.

III. Evaluation of Wheat Quality

Canada has a reputation for supplying high quality uniform wheat and this is reinforced throughout the system. The mechanics of enforcing the quality standards were discussed above. At present, there are two important issues in this area that are being subjected to study and debate. Namely, inland cleaning and blending.

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[1] Canada Grains Council, Wheat Grades for Canada - Maintaining Excellence.

Table 18

Import Prices by Class, Basis C and F Japan

Crop Year	Australian Standard White	No. 1 CWRS 13.5%	U.S. No. 2 Dark North Spring 14%	U.S. No. 2 Hard Winter 13%	U.S. No. 2 Hard Winter Ordinary	U.S. No. 2 Western White
	dollars per tonne					
1970/71	68	76	73	73	68	69
1971/72	64	72	70	69	65	65
1972/73	83	105	98	100	99	99
1973/74	180	224	213	220	223	215
1974/75	183	223	215	206	192	187
1975/76	159	204	200	185	168	162
1976/77	126	154	148	140	128	125
1977/78	127	146	138	131	125	132
1978/79	161	179	168	166	154	159
1979/80	204	234	220	216	207	194
1980/81	216	264	243	230	220	201
1981/82	202	234	215	213	203	191
1982/83	196	225	211	215	201	202
1983/84	187	227	213	212	189	182
1984/85	174	212	196	188	177	167

Source: Canada Grains Council, Wheat Grades for Canada, p. 127 (for 1970/72 - 1980/81).

International Wheat Council, World Wheat Statistics, 1985, p. 72, (for 1981/82 - 1983/84).

International Wheat Council, Review of World Wheat Situation, 1984/85, p. 42 (for 1984/85).

Table 19

Annual Price Indices, Major Wheat Exporters

Year	Argentina	Australia	Canada	USA
1970	89.5	89.8	100.3	94.9
1971	94.2	84.2	100.9	97.6
1972	99.9	87.0	100.3	96.1
1973	89.0	63.6	95.5	104.4
1974	101.3	85.3	118.1	101.2
1975	100.0	109.5	104.0	97.5
1976	89.5	100.6	107.3	95.7
1977	80.1	104.3	99.5	94.4
1978	86.9	83.6	93.3	102.0
1979	89.0	83.1	100.1	99.1
1980	94.4	90.5	101.2	99.0
1981	98.6	101.5	107.0	95.3
1982	102.7	100.5	104.5	95.1
1983	88.7	96.2	105.9	99.4
1984	84.8	99.3	110.0	97.6
1985	81.0	97.0	111.6	99.5
1986	77.6	99.6	98.8	94.6

Note: Price Index = average annual price received by exporter divided by annual world price x 100.

Source: Canada Grains Council, Wheat Grades for Canada, p. 123 (for 1970-80).

FAO, updated data.

a. Inland Cleaning

Most of the grain cleaning to export standards is carried out at terminal positions (e.g. Thunder Bay, Vancouver, Prince Rupert) thousands of miles from the point of production. A recent study by James Leibfried investigated the benefits and costs of enhancing inland cleaning capacity.

The rationale for terminal cleaning is largely historical (Leibfried). Originally most of the export destined grain moved through Thunder Bay, where terminal cleaning first started. In the past, grain companies typically stored grain for longer periods of time and cleaning improved the storability of the product. There was not as much concern about throughout efficiency and as new terminals were built, cleaning facilities were routinely installed. Cleaning charges have always been an important source of revenue for the Canadian grain companies.

The export capacity of the Canadian system has been increased from 20 to 30 mmt over the past ten years. As of 1986, there were 1,860 primary elevators, 22 terminal elevators, 28 process elevators and 24 transfer elevators. In 1965 the storage capacity of primary elevators was 10.7 mmt and by 1986 this declined to 7.7 mmt a reduction of 28 percent (Canada Grains Council Statistical Annual). As a result, through-put rates have increased and there is added pressures for more inland cleaning to improve overall efficiency.

In the past grain companies have earned significant profits from terminal cleaning. This resulted from the sale of reclaimed grain and screenings for feed purposes (Leibfried). The farmer is assessed a cleaning charge ($1.67 per tonnes) and he is not paid for the "dockage." The Leibfried report recommends experimentation with the cleaning of grain to export standards on farms or other inland positions. Economic incentives over time suggest that there will probably be more and more inland cleaning.

b. Blending

The Canadian Grain Commission regulates the blending of grains from different grades. Blending is not restricted at the primary elevators but at the terminal elevators only 2 percent of the higher grade can be a blend from a lower grade. For example, if 1,000 tonnes of No. 1 CWRS is delivered to a terminal elevator, no more than 20 additional tonnes of No. 1 CWRS can be created through blending. If blending above the allowable 2 percent occurs at the terminal, the grain can be confiscated.

In July 1987 the Canadian Grain Commission warned grain companies against blending No. 1 and No. 2 canola to create more No. 1 than was actually delivered to export positions. The cargoes were shipped to Japan and although they were officially graded No. 1 the Japanese importers were complaining. Some farmers have questioned the Canadian Grain Commission's approach since it gives the Japanese the benefit of buying lower priced No. 2 canola which otherwise would have been blended into No. 1.

The fact that blending is not restricted at primary elevators gives grain companies the potential to profit from blending. This is especially true for CWB grains. As agents of the CWB, the companies buy CWB grain from the farmer at primary elevators. However, the CWB does not purchase the grain from the elevator companies until it reaches the terminal location. Therefore, the creation of the value through blending is not captured by the CWB.

IV. Summary and Conclusions

This paper presented an overview of the Canadian wheat production and marketing system. Major differences between the United States and Canadian systems were highlighted. These differences are summarized in Table 20. Some of the major conclusions are:

Table 20

Comparison of Canadian and United States Systems

Activity	Canada	United States
Predominant Wheat Crop	Hard Red Spring Wheat	Hard Red Winter Wheat
Wheat Yields	Annual growth rate is near zero	Annual growth rate is 37 kg/ha
	Yields average 1-82t/ha	Yields average 2-17t/ha
Varieties Grown	Highly restricted by government	Unrestricted
Production Technology	Less intensive than the United States	More intensive than Canada
	20-25% of arable land is fallowed	Small amount of fallowing
	Most of the crop is swathed	Small amount of crop is swathed
Handling Technology	Stocks to production ratio averages .8	Stocks to production ratio averages .6
	All grain is cleaned at export terminal	Grain can pass through export terminal without cleaning
	Blending of grades at export terminal is not permitted	No restrictions on blending
	Vertical cement bins are used for storage at export terminals	Horizontal storage bins are common
Export Price	Generally above world average	Generally below world average
Producer Price	Set by the government for each crop year	Determined in competitive marketplace
Government Subsidies	Transportation subsidy	Deficiency payments
	Income Stabilization	Paid acreage diversion

- Wheat is the most important agricultural commodity produced in Canada.
- The predominant crop in Canada is hard reg spring wheat compared to hard red winter wheat in the United States.
- Absolute wheat yields and the yield growth rates are lower in Canada than in the United States. This difference is due to varieties grown, climatic conditions and fertilizer usage.
- Summerfallowing is a common practice in Canada and it accounts for 20-25% of the arable land. This production practice is much less common in the United States.
- Both fertilizer and herbicide usage is less in Canada compared to the United States.
- Canada tends to store a larger percentage of its wheat crop than does the United States.
- About 75% of the Canadian wheat crop is exported on average, compared to 65% for the United States.
- Canada specializes in exporting high quality uniform wheat and durum wheat. The price premium for Canadian wheat fluctuates considerably from year to year. The high quality uniform product does not guarantee Canada a constant market share. For example, FAO data indicates that the Canadian Wheat Board was forced to "cut" prices in 1986 in order to maintain market share.
- Canada exports more than 50% of its wheat to Communist Bloc countries. The United States has a more diverse set of buying countries.
- The Canadian production and marketing system is much more heavily regulated than is the case for the United States.
- Canadian government regulations heavily influence the technologies used to clean and handle wheat at export terminals. Virtually all wheat is cleaned at

the Port and vertical cement bins are most commonly used. Restrictions on blending at the Port means the Canadian Terminal elevators cannot handle grain as efficiently as Terminals in the United States.

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Background Paper No. 5

A Comparison of Quality Factors of the Australian and United States Grain Systems

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I. Introduction

Australia is the fourth largest wheat exporting country following the United States, Canada, and the European Community. The market share for Australia in recent years has been between 11-18 percent. Production is quite volatile compared to other exporters. However, of particular importance is that a very large proportion of the wheat produced in Australia is exported--up to 80-90 percent in recent years--compared to other exporters. The wheat produced in Australia is exclusively white. It is generally considered a weaker wheat with protein in the area of 9-11 percent, however, some regions are capable of producing up to 14-15 percent. Wheat in Australia has a reputation for being very dry with harvest moisture about 9.5 percent and relatively superior "hygiene." The latter refers to both the general cleanliness and lack of infestation. Levels of impurities are generally less than .4 percent, and insect problems are virtually eliminated despite a climate being very condusive to insect proliferation.

There are a number of institutions and institutional relationships which influence the quality of wheat being produced, marketed and exported in Australia. These include the Australian Wheat Board (AWB), monopoly grain handling authorities in each state, variety release and control procedures, and a set of receivial standards which are applied at the point of first sale. Each of these are interrelated and have important impacts on the quality of wheat exported from Australia. The purpose of this study is to analyze the institutions, policies, and trading practices which have an influence on the quality of wheat exported from Australia. In the first section below, an overview is presented of wheat production and marketing. Data are presented on supply and demand, exports by value and market share by destination. Historical data are presented for yields and quality. In addition, production practices and input utilization are described. The fulcrum of the marketing system in Australia is the AWB which is described in detail in Section III. Receival standards, producer pricing policies, sale strategies and quality control procedures are major topics in this section. In addition highlights from a recent government inquiry are presented. There is limited on-farm storage in Australia and each state has a monopoly grain handling authority for both origination and export. As the sole agent of the AWB these handling authorities play an important role in quality control and maintenance. The characteristics and operating practices of the grain handling industry are described in Section IV. The procedures used for variety development and release are described in Section V. A complete description of quality control is presented in Section VI. Insect control procedures are described in Section VI. Finally, Section VII presents a summary with comparisons of important points to the U.S. marketing system.

II. Overview of Marketing and Production

The purpose of this section is to provide background information on wheat production in Australia. In the first sub-section below supply/demand data are described and Section B provides a detailed analysis of exports and market share by principal destination. Cross-sectional and time series data on yields and the quality of the wheat produced in Australia are presented in Sections C and D. The final subsection provides an overview of farm size and production practices.

A. Supply and Demand for Wheat

Wheat production in Australia is limited to the regions including the south and east coast, and in Western Australia (Figure 2.1). The largest wheat producing state in New South Wales (NSW) followed by Western Australia (WA), Vistoria, South Australia, and Queensland (Table 2.1).[1] In the past 10 years production shares across the largest four wheat producing states were: New South Wales 35 percent, Western Australia 29 percent, Victoria 16 percent, and South Australia 11 percent. The distribution of wheat production across state has been relatively constant.

Total production of wheat and other fundamental data are shown in Table 2.2 and Figure 2.2. There has been a very slight increasing trend in production over the past 20 years. However, of particular importance is that production is quite volatile through time. Substantial reductions in production were observed at least four times in the past 25 years, and several of these are directly attributable to drought conditions (e.g., 82/83). In each case these were followed by above normal production in subsequent years.

---

[1] Tables referred to in this section are contained in Appendix A, and figures are at the end of each subsection.

Area planted to wheat in Australia has been increasing since the early 1960s (Table 2.3 and Figure 2.3). There was a sharp reduction in 1970, and since then area planted has increased gradually. After reaching a peak of 12.9 million hectares in 1983, area planted has decreased to an estimated 10.0 million hectares in 1987. This reduction has occurred because of the decreasing relative profitability of wheat--caused by the simultaneous occurrence of lower wheat prices and a rapid escalation in wool prices, sheep being an alternative crop.

Domestic use of wheat in Australia comprises a small proportion of total disappearance (Table 2.2). In recent years domestic use has comprised only about 15 percent of total disappearance, a decline from earlier years. However, compared to other exporters, the relative importance of domestic wheat use in Australia is very small (Table 2.4) merely reinforcing the importance of exports as a source of demand. The principal source of domestic demand is for human consumption. Wheat used for feed ranged from 35-48 percent of domestic use in 1979/80-1982/83, but since has declined to 9 percent in 1985/86 (Australian Wheat Board Annual Report 1985/86). The data presented in Table 2.5 indicate that of the flour produced in the domestic industry about 45 percent is used by bread bakers, and 22 percent by starch/gluten manufacturing. Australia is a major manufacturer and exporter of gluten.

Exports of wheat reached a peak of 16.1 MMT in 1985/86, but have since declined to a projection of 11.0 MMT in 1987/88. In the mid-1980s, 80-90 percent of the wheat produced in Australia was exported. This is very high compared to other exporting countries (Table 2.6), again indicating the relative importance of wheat exports in Australia. The decline in the recent year is largely due to the reduced production.

Traditionally, Australia carried minimal stocks between crop years. However, beginning in the late 1970s, ending stocks began to increase. Record stocks were held over in 1984/85 at 8.6 MMT, but have since decreased in 1987/88 to less than 4 MMT. Another way to evaluate stockholding is ending stocks relative to production (Table 2.7). In the mid-1970s ending stocks were about 14-22 percent of production, but since then the percentage increased to 47 percent in 1984/85. Compared to the U.S. and Canada, ending stocks as a percent of production is less in Australia. This suggests that despite the variability in production Australia is less willing or capable of holding stocks between years than the U.S. or Canada.

B. Exports

Australia typically comprises between 2.5-4.0 percent of world wheat production (Table 2.8). Exports of wheat from Australia increased to a peak of 16.1 MMT in 1985/86, but have since decreased due to reduced production (Table 2.2 and Figure 2.2). In fact, Argentina and Australia are the principal exporters which reduce exports in the past two years, offsetting the gains obtained from the U.S. (Table 2.9). The market share for Australia was in the area of 10-12 percent in the late 1970s, increasing to 18.5 percent in 1985/86 (Table 2.10 and Figure 2.4). Again, it was primarily the market shares of Australia and Argentina which have fallen in the past two years.

The largest six importers of Australia wheat include: USSR, Egypt, China, Japan, Iran, and Bangladesh. These are listed in approximate rank over the past three market years. In 1985/86 these countries imported 70 percent of the wheat exported from Australia. Historical data on exports to the largest 10 importing countries are reported in Table 2.11 by volume and 2.12 (and Figure 2.5) by market shares. The USSR is now the single largest importer purchasing 20 percent of Australia's wheat in 1985/86. However, the

USSR only recently became an important customer with substantial increased beginning in 1979/80.

Australia has dominant positions in two markets--Iran and Malaysia. However, in several markets the Australian market shares have decreased substantially. The Australian market share in China decreased from 48.3 percent in 1969/70 to 19.6 percent in 1984/85. Decreases in market shares have also been observed in Egypt, Indonesia since 1979/80 and Malaysia since the mid-1970s. Market shares in the remaining countries do not illustrate trends, but are sporadic. Australia and the U.S. compete in most of the markets with the exception of Iran. The U.S. and Australia are the principal competitors (defined as the largest two suppliers) in a number of markets including China, Egypt, Iraq, and Indonesia.

The wheat exported from Australia exclusively white and generally of medium protein level. Thus, the principal classes of competition from the U.S. are white, and Hard Red Winter (HRW). Export data from Australia and these two classes are shown in Table 2.13 for volume, and 2.14 by market share and Figures 2.6 and 2.7.

The AWB publishes data on exports by class. Comparisons are made in Table 2.15 which demonstrates the relative importance of exports of the different classes. The dominant export class is ASW which comprised 84 percent of the exports in 1980/81. Since then this has decreased to 77.1 percent in 1985/86. During this time period there have been a noticable increase in GP which includes a small portion of feed wheat. New South Wales (NSW) is the domestic state which exports Prime Hard and Hard Wheat (Table 2.16). Hard wheat is also exported in minor amounts from South Australia, Western Australia, and Queensland. Each state exports ASW. Exports of GP have been increasing through time with generally the same increases across states.

C. Productivity

Yield comparisons between major wheat exporters are shown in Table 2.17, 2.18, and Figure 2.9. Yields in Australia are nearly always the lowest among the major exporters ranging from 1.4-1.5 MT/Ha in recent years. This is in comparison to French wheat yields of up to 6.0 MT/Ha and U.S. wheat yields of 2.3-2.6 MT/HA in recent years. Another feature of yield behavior in Australia is the sharp reduction in 1972, 1977, and 1982, generally consistent with drought conditions. Yield behavior is very sporadic, an example being the increase from 0.7 MT/Ha in 1982 to 1.7 MT/Ha in 1983. This sporadic behavior has important implications for the grain handling storage system, and export strategies.

Casual observation of the data in Figure 2.9 suggests there is not a trend to wheat yields in Australia. To evaluate the productivity growth between countries, a semi-log model was estimated over the time series 1962-86.[2] Results are shown in Table 2.19 along with the derived growth rate for each exporting country. This is strictly interpreted as the constant relative, or proportional change in yields per year. Over the time series the fastest growth rate was that of France followed by the U.S. There was not a significant trend in the case of Australia suggesting a nil growth rate in productivity. Also of interest is the R^2 which is the percent of variability in yields explained by the trend. These values for Australia, and Argentina and Canada, are relatively low indicating both very little growth and substantial variability in yields. Actual yields and those predicted from the growth model are shown in Figure 2.10

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[2] The estimated model was $\log y = \gamma + \beta T$ where Y = yeild and T = trend, T = 1, 2, . . .

There are a number of reasons for low yields in Australia including low prices, low rates of fertilization, and little rainfall.

D. Quality

There are seven classes of wheat produced and marketed in Australia. These include Prime Hard (APH), Hard AH), Australian Standard White (ASW), Soft, Durum, General Purpose (GP) and Feed. Each of these to some extent is further segregated by protein level, or the level of non-millable materials.[3] The AWB publishes crop quality data for wheat received into the marketing system for APH, AH, ASW, and GP. Further detailed quality analysis is conducted on the former three qualities.

The percentage of receivals by class are shown in Table 2.20 since 1976/77. Generally, about 68 percent of the wheat received is classed as ASW, 15 percent AH with the other two classes about equal. Purusal of the data indicates there were spikes in 1983/84 and 1985/86 in the GP class. The magnitude of those spikes would suggest an increasing trend, but this conclusion would be preliminary given only two years. In both 1983/84 and 1985/86 these crop quality problems developed because of rains during harvest resulting in an increase in weather damage. Also of interest is the apparnet decrease in recent years of both APH and PH.

Detailed quality data of the 1986/87 crop are presented in Table 2.21. Only selected quality data are presented in this table. Data for "typical" Australian wheat classes are shown in Table 2.22. As indicated there are slight differences in quality between ports, even within a class. The principal difference between classes is the protein level, and the end use performance associated with protein (e.g., water absorption). The protein level for APH is nearly 1 percent over the required amount of 13 percent and 14 percent, respectively. ASW protein levels are generally about 10 percent. For comparison selected data on U.S. Hard Red Winter (HRW) and Western White (WW) are shown in Table 2.23. Noticeable differences exist between test weight and extraction rates, those for Australia wheats being greater. Protein levels for HRW are similar to AH and those of white are similar to ASW. Water absorption for AH is similar to HRW, but WW is substantially less than that of ASW.

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[3] Detailed description of these segregations are presented in later sections of this report.

Time series data for selected Australian wheat quality parameters were collected for 1970/71 - 1986/87. Simple averages for each class are listed by state in Table 2.24. Test weight is relatively high and does vary across states. The average for ASW, for example, ranged from 76.5 for Western Australia and New South Wales to a high of 81.4. Protein levels also varied not only across classes, as expected, but also across states. The average protein level for ASW ranged from 10.4 in Victoria to 11.3 in Queensland; that for AH ranged from 12.1 in Western Australia to 13.5 in Victoria.

To examine the time series behavior of the protein level, the data were averaged across states using weights in proportion to receivals. Thus, for each class a weighted average protein level was derived. These results are shown in Figure 2.11 and the statistical results in Table 2.25. The results indicate that there is not a significant trend (at the 10 percent level) in the average protein level for any of the classes. However, the trend coefficients for ASW and APH are negative and the latter is significant at the 12 percent level. Examination of Figure 2.11 illustrates the behavior of actual protein levels through time. Though not substantially significant the major concern in Australia is that during the last four years the actual protein levels were less than trend, and that preliminary estimates for the 1987 crop were 9.1 percent.

E. Farm Sector

The farm sector in Australia is going through a transition just like that of most of the other exporting countries. The purpose of this section is to briefly describe selected statistics of the farm sector.

The structural characteristics of the farming industry is changing toward larger and fewer farms. Table 2.26 indicates the area sown to wheat in NSW for a number of years. The important structural shift is toward a reduction in the total number of farms. In addition, there is a decrease in the total number of farms less than 500 hectares, and an increase in those greter than 500 hectares.

A more detailed profile of farms in the wheat-sheep zone is provided in Table 2.27. The wheat-sheep zone is that in which most of the wheat is produced and is shown here for demonstration purposes. (Similar data for other zones and states are also available in the Bureau of Agricultural Economics "Farm Surveys Reports".) There are a number of points of interest:

1) Wheat is the dominant crop comprising nearly twice the cash receipts and three times the area harvested compared to other grains;

2) Sheep and income related to sheep are very important to wheat farms in Australia. In 1985/86 cash receipts from sheep and wool nearly equalled that of wheat, and apparently is becoming proportionately more important. In fact the projected increase in total cash receipts in 1986/87 is nearly all due to higher current sheep and wool prices.

3) Returns declined between 1984/85 and 1985/86, and are expected to increase in 1986/87--though they are still negative.

Wheat farming in Australia involves extended rotations with clover and sheep. Casual conversations with producers indicated they used to plant four years of wheat and two years of pasture. However, due to reduced wheat prices and increased sheep/wool prices, they are now following a two-year rotation of wheat and four years pasture. One purpose of this is to increase the soil nitogren. Superphosphate is a dominant fertilizer used in Australia wheat. Table 2.28 shows the amount applied to wheat, and the crop area fertilized. While this is very aggregate data, it is clear there has been a sharp reduction in fertilizer use since the peak in 1981/82, both in total and per hectare of crop land.

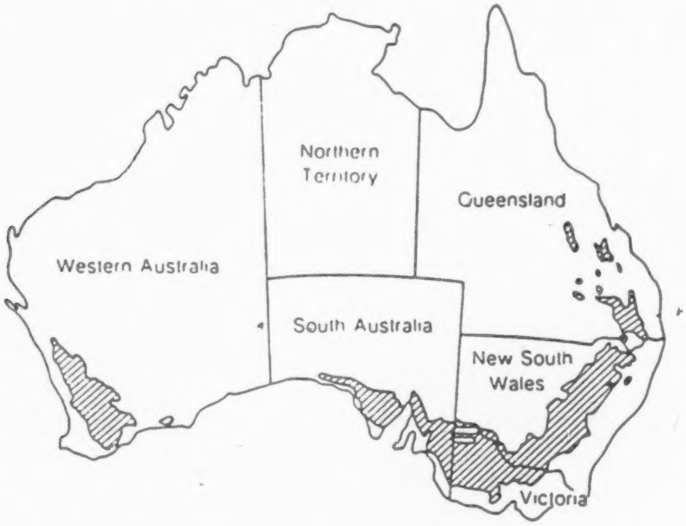
Northern Territory
Queensland
Western Australia
South Australia
New South Wales
Victoria

Figure 2.1. Wheat Growing Regions of Australia.

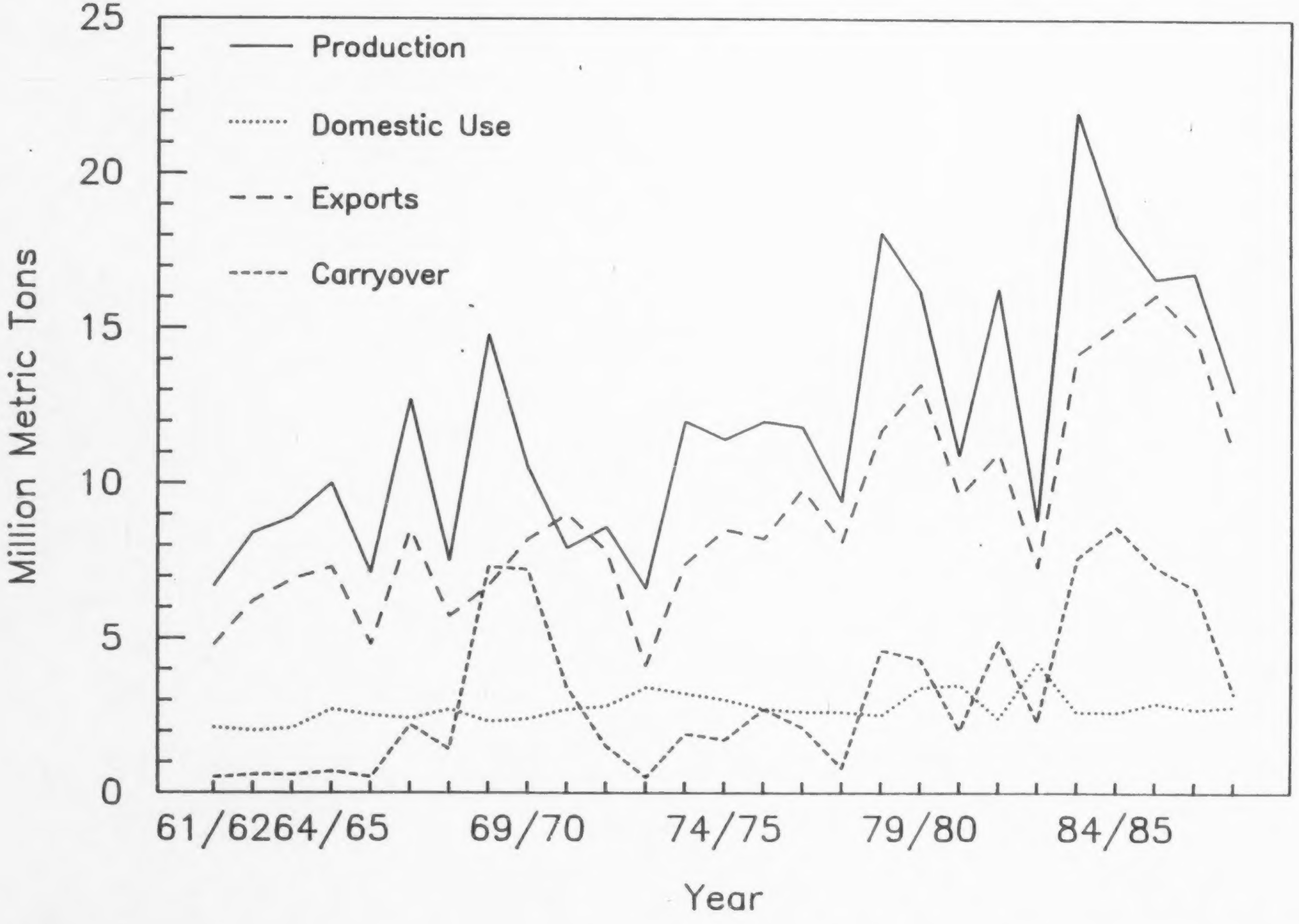

Figure 2.2 Wheat Supply and Disappearance for Australia

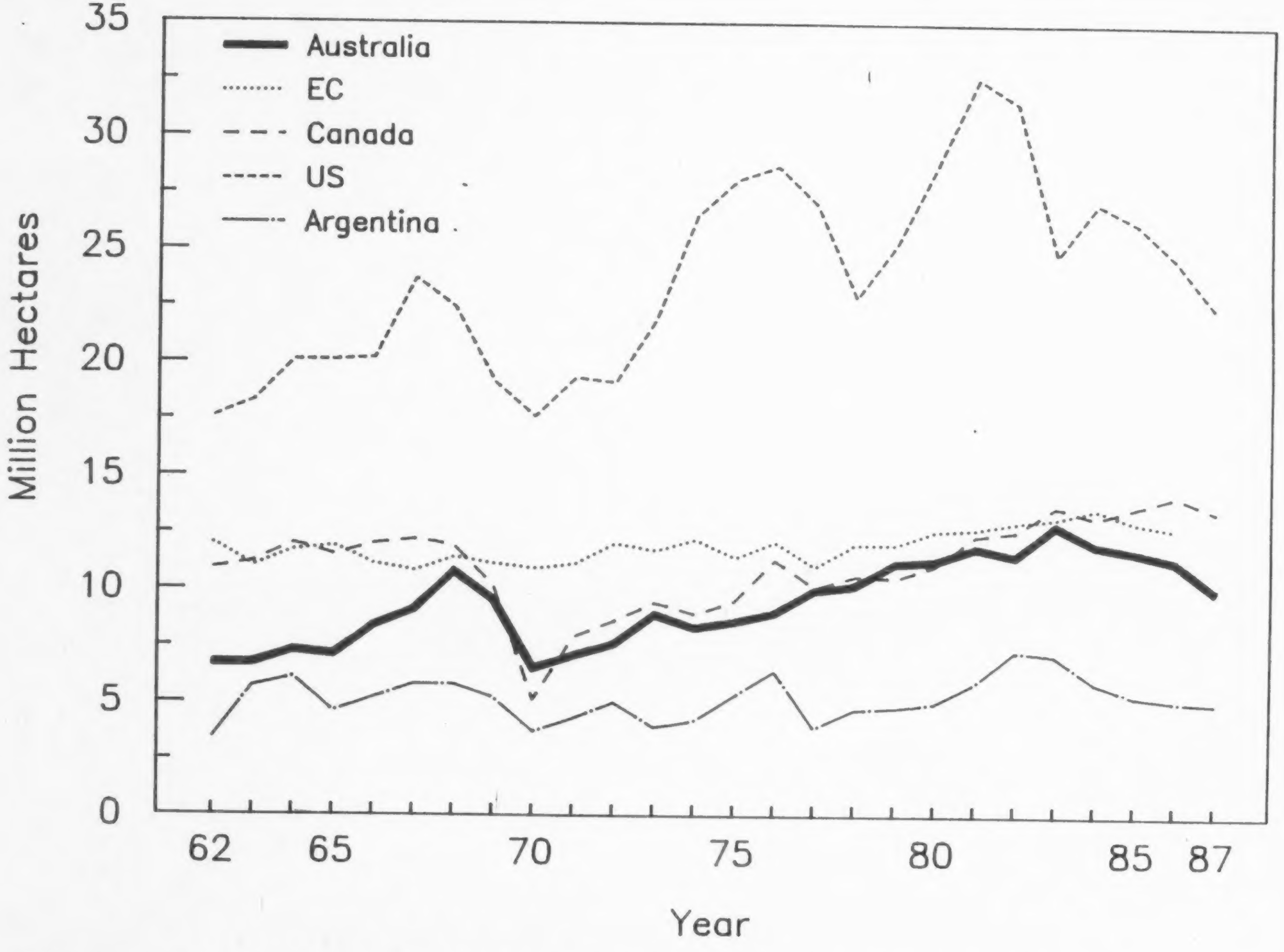

Figure 2.3 Planted Area by Major Exportors in Million Hectares

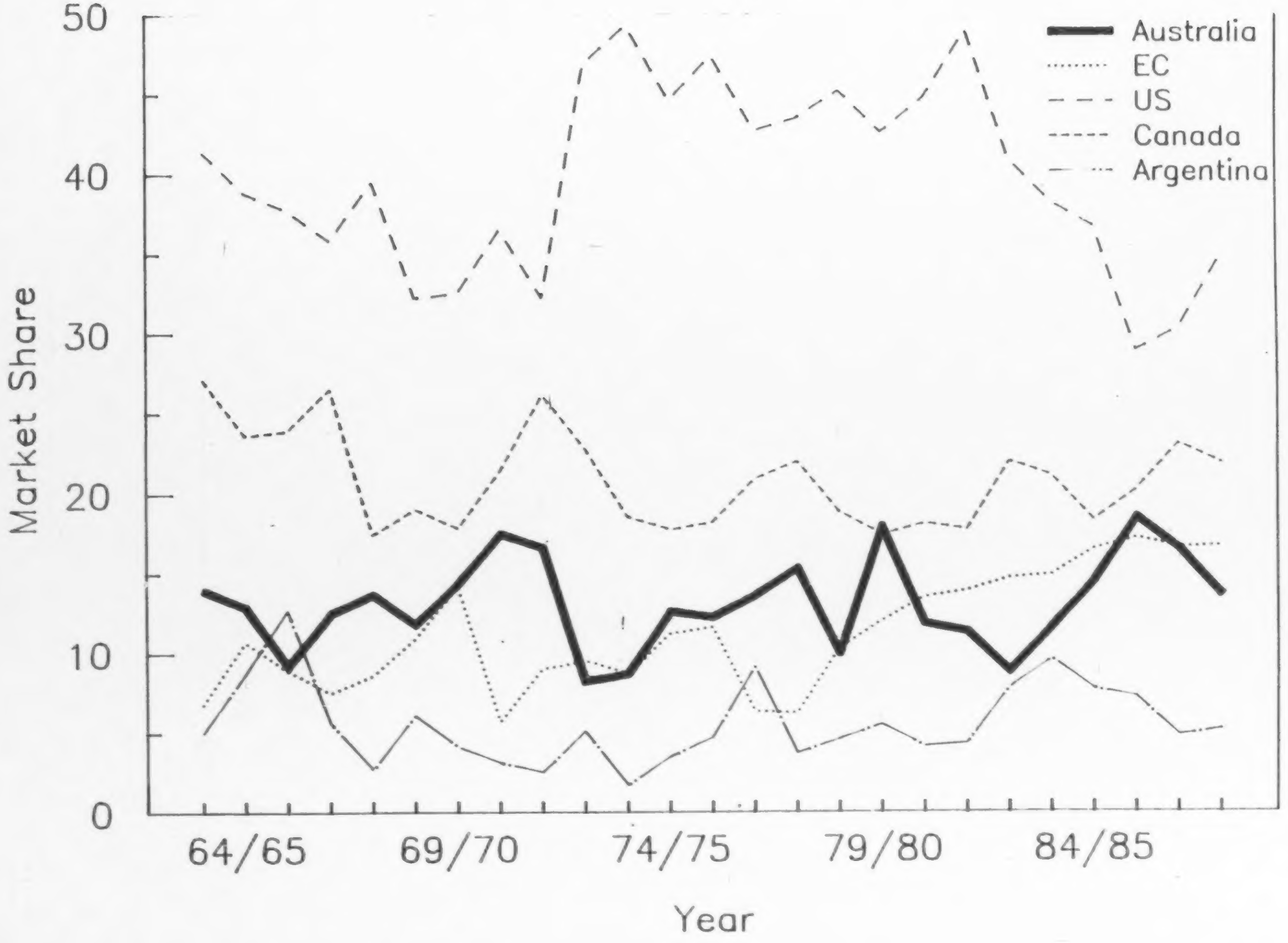

Figure 2.4 Market Share of Exports by Major Exportors

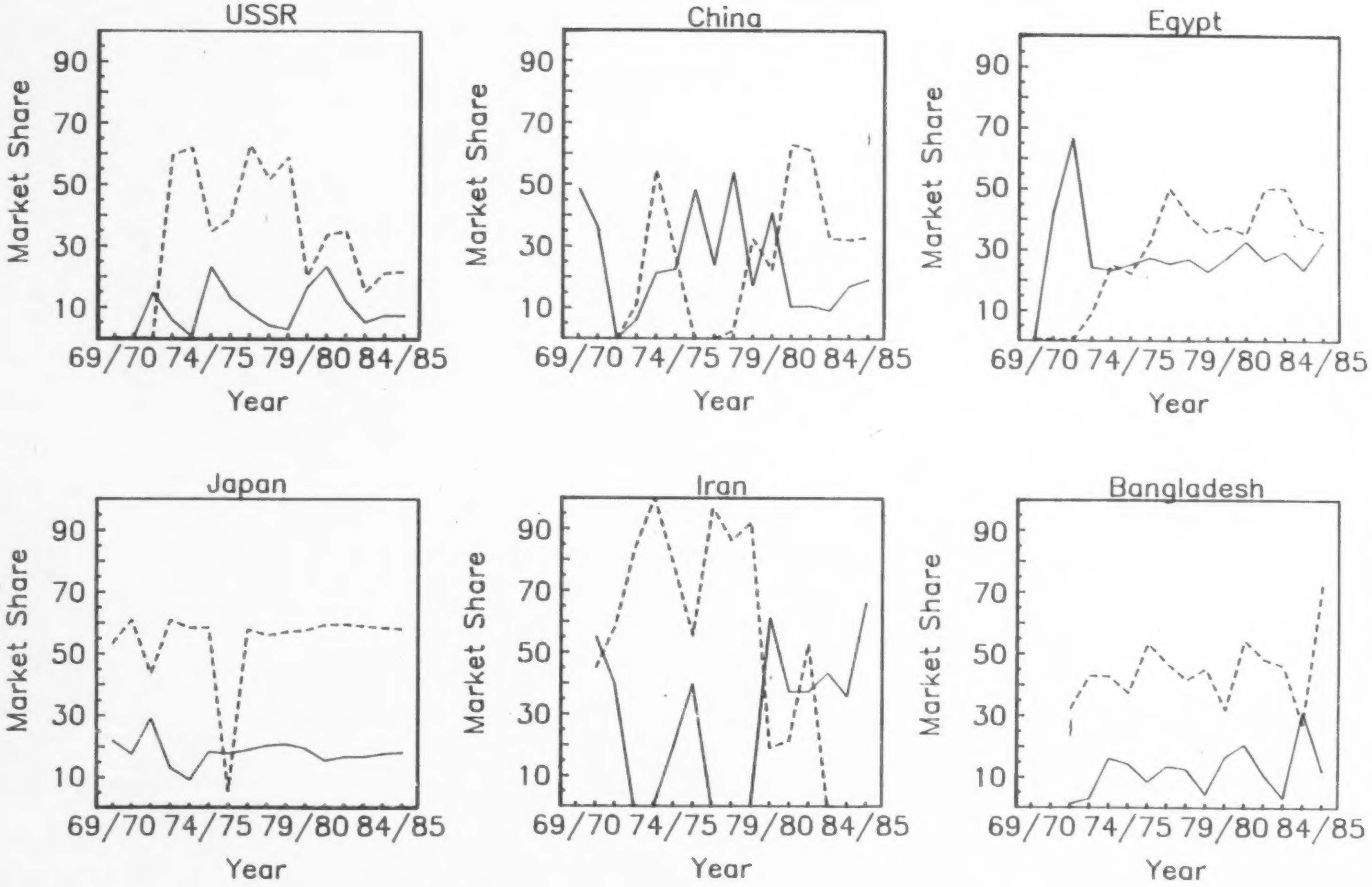

Figure 2.5 Market Share for Australia (—) and US (---) to Selected Countries

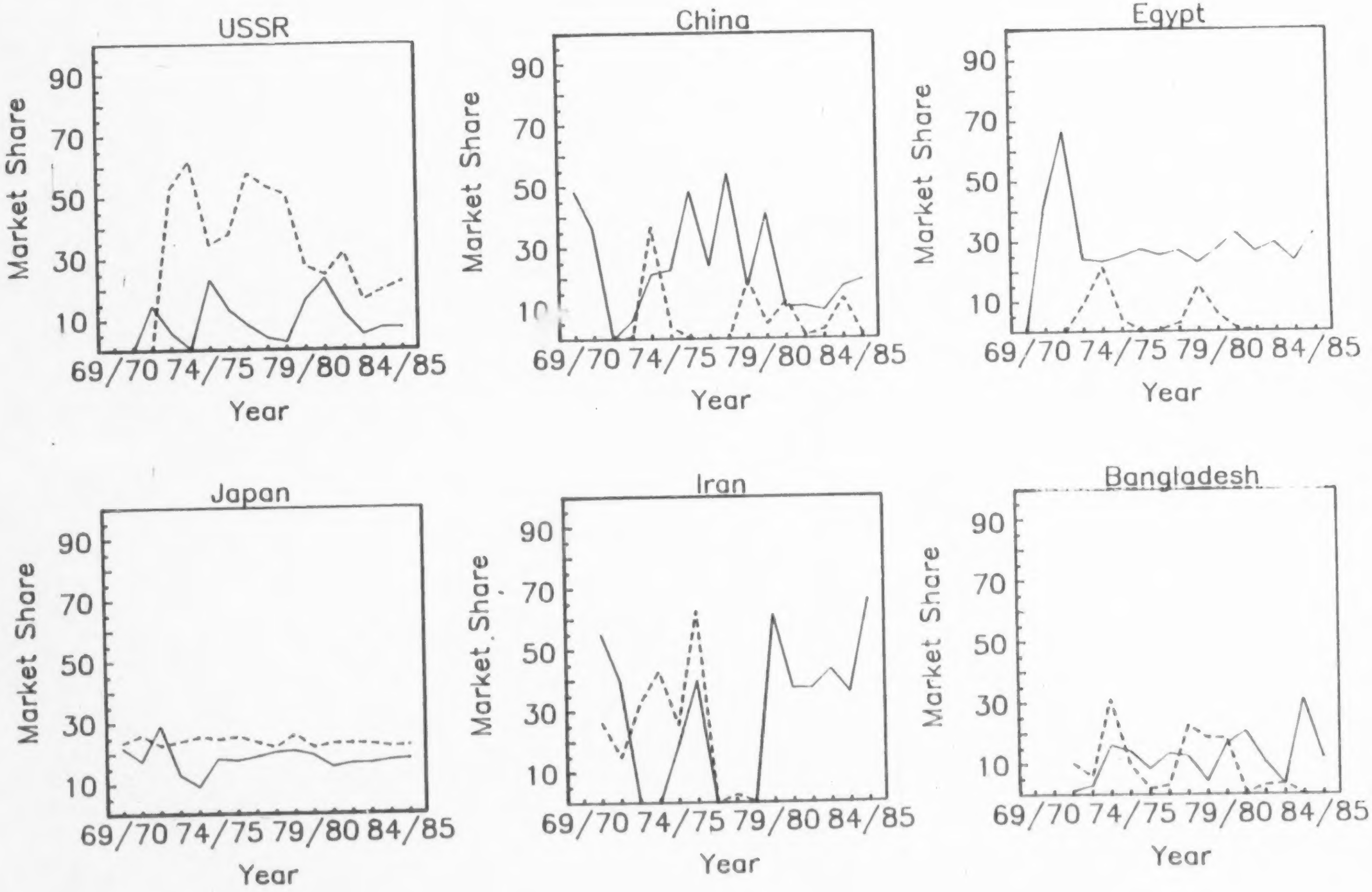

Figure 2.6 Market Share for Australia (—) and US HRW (---) to Selected Countries

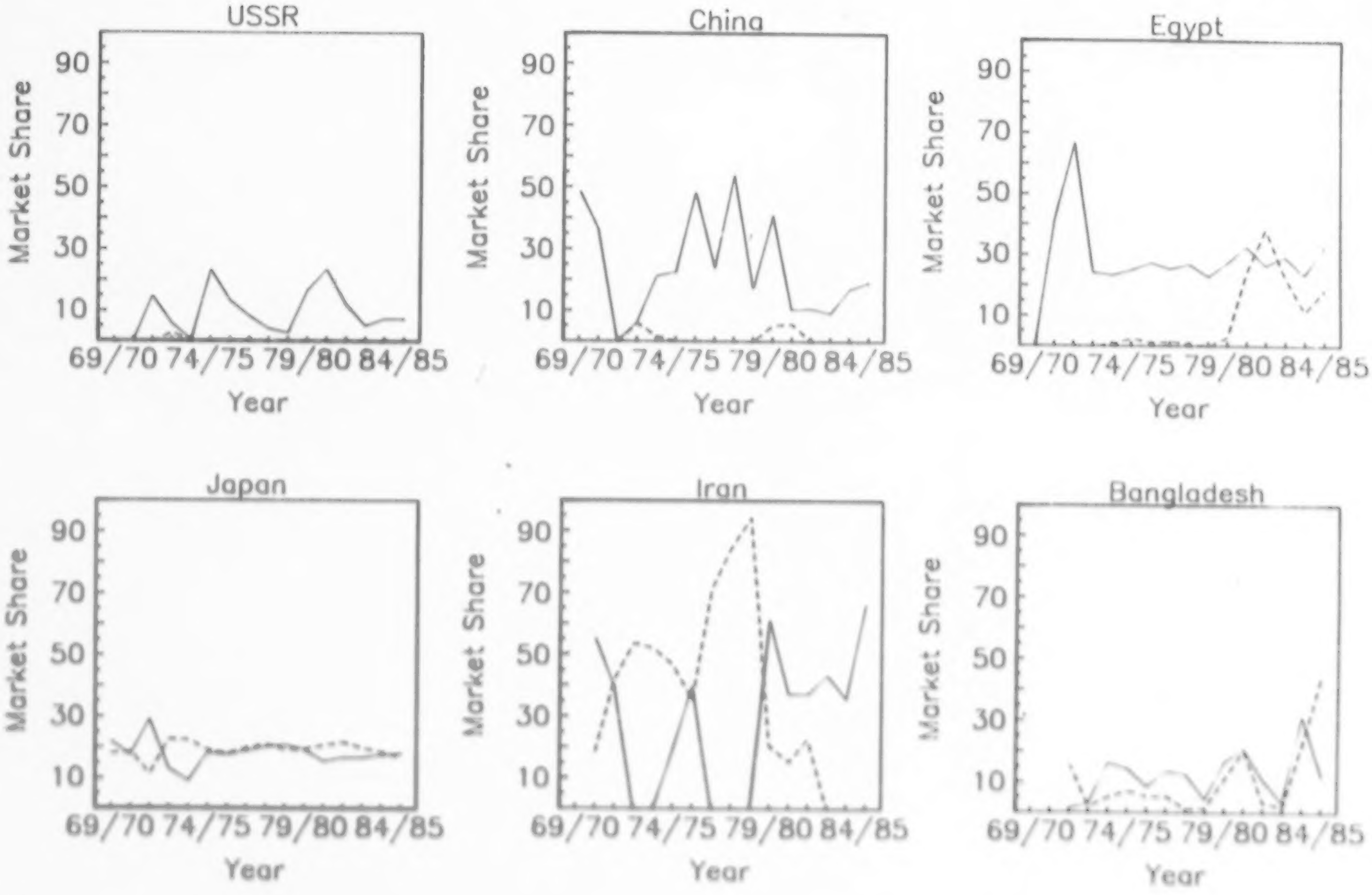

Figure 2.7 Market Share for Australia (—) and US White (---) to Selected Countries

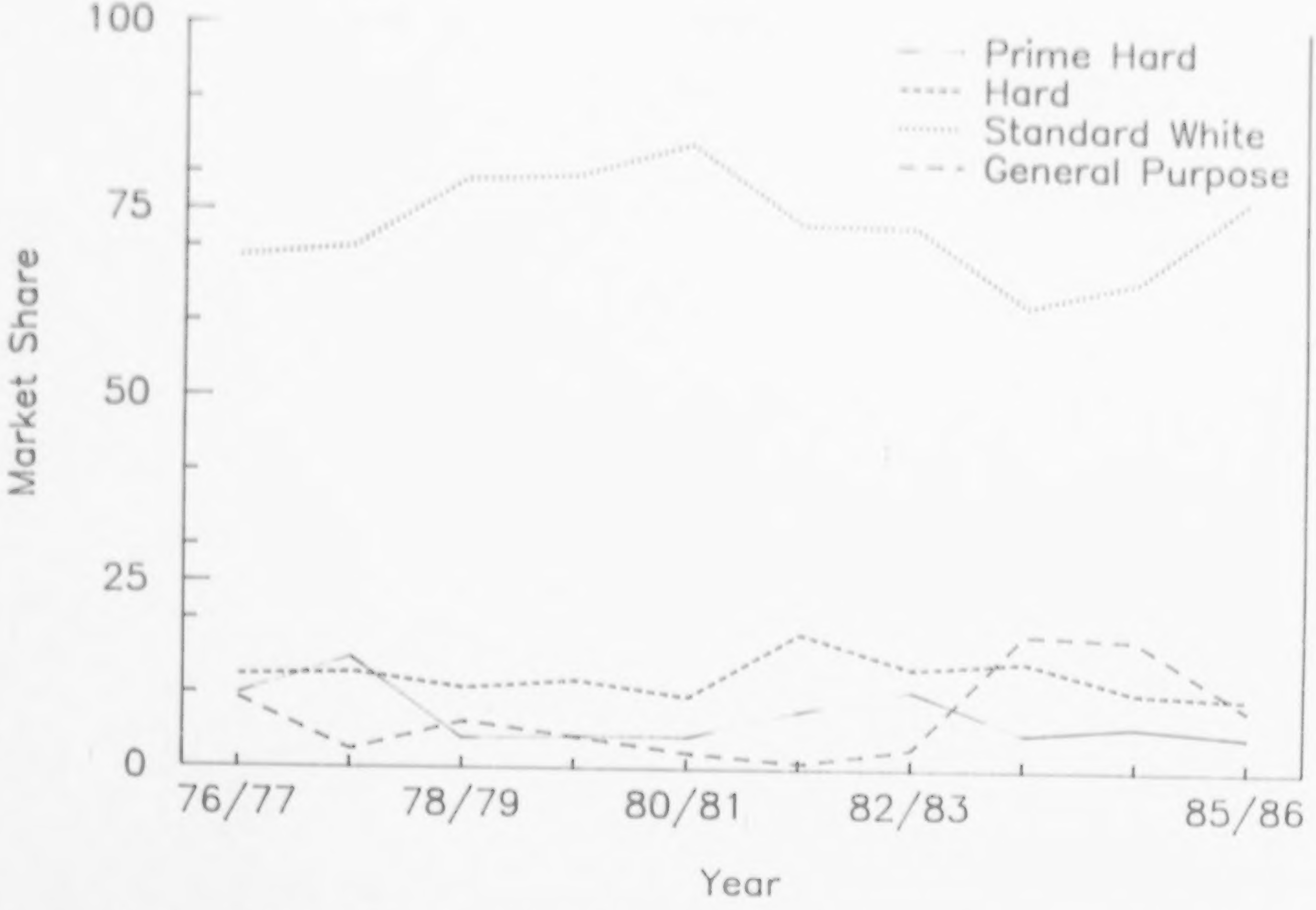

Figure 2.8 Market Share by Class of Australian Wheat Exports

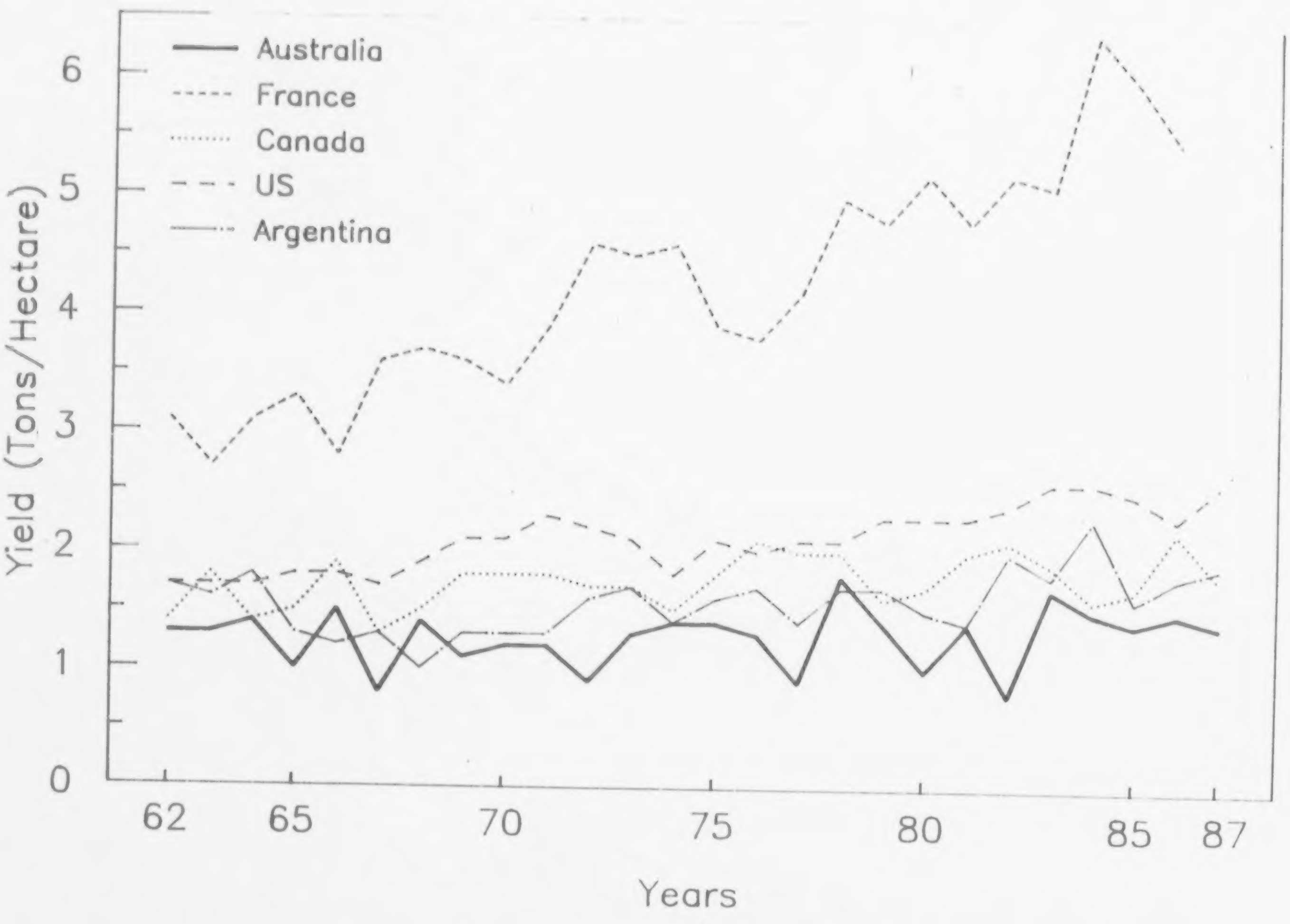

Figure 2.9 Yield by Major Exportors in Tons/Hectare

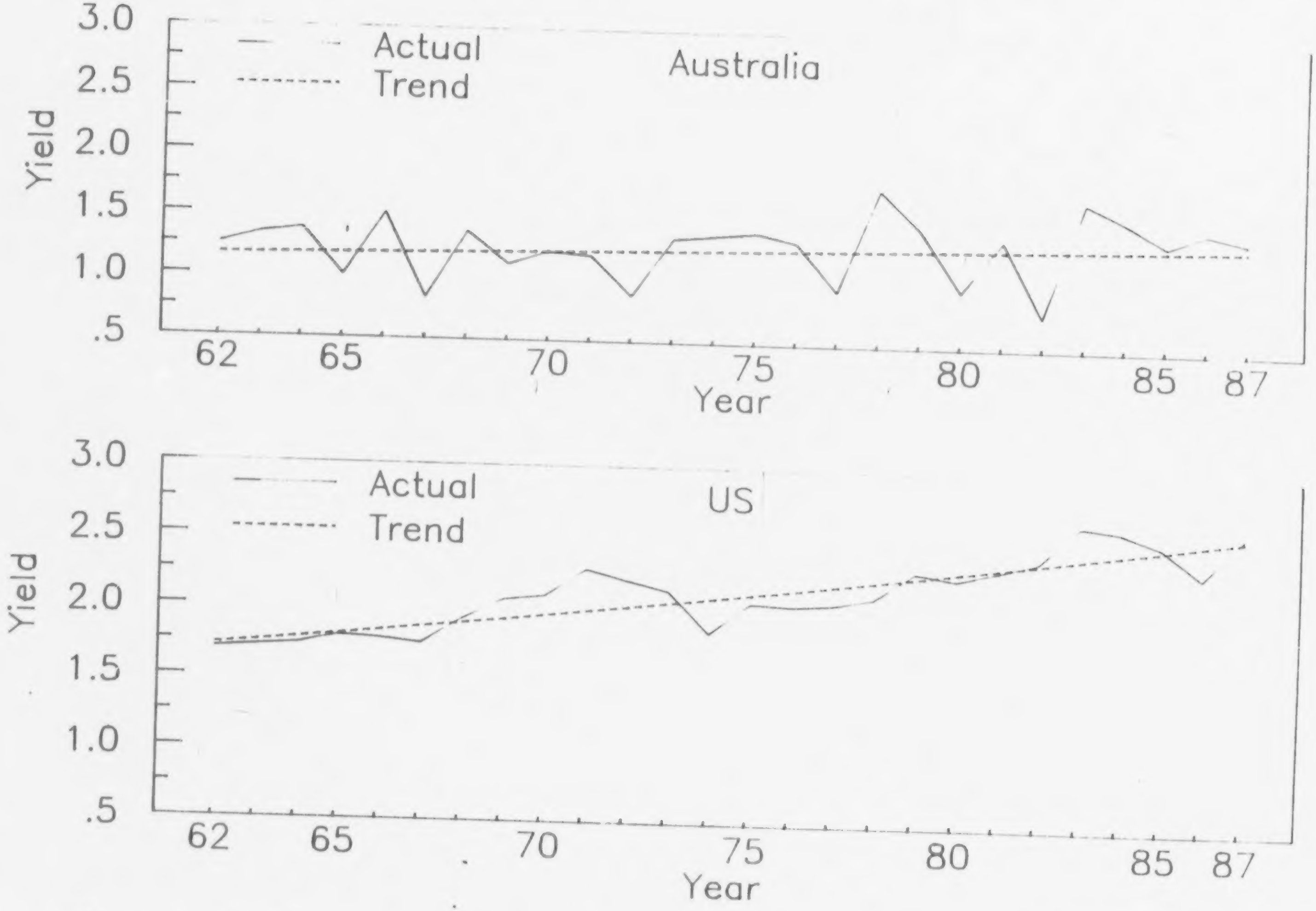

Figure 2.10 Australia and US Yield Trends

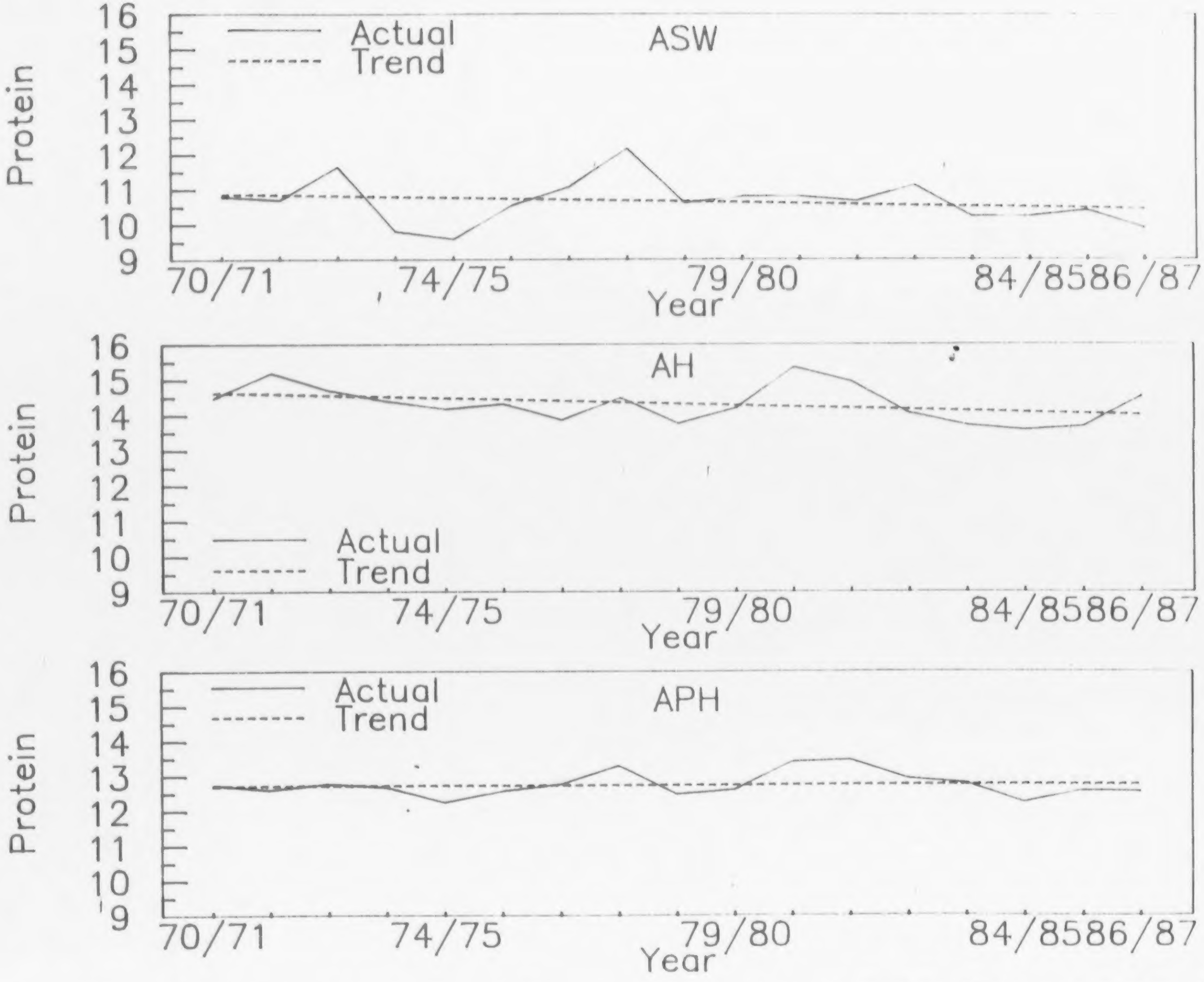

Figure 2.11 Average Crop Protein, 1970/71–1986/87

III. The Roles and Functions of the Australian Wheat Board (AWB)

The single most important institution in the Australian wheat industry is that of the AWB. The AWB is involved in variety control, the establishment of grade standards, administering producer price policy, and domestic and export sales. In addition, the AWB has established procedures for resolving many potential problems associated with quality. The purpose of this section is to describe the activities of the AWB. In the first section below the history of the AWB is briefly described as well as its current objective and acitivites. One of the important functions of the AWB is that of setting receival standrds, which essentially form the basis of the grading system in Australia. Government producer price policies are administered by the AWB and these are described in a subsequent section. Sales procedures and trading practices are discussed in the following section. In the final section highlights from a recent public inquiry into the wheat industry are described.

A. Historical Background and Current Objectives

The origins of the AWB began in 1939 as a war time defense organization. Prior to that the wheat marketing was conducted by private traders and exporters. The 1939 legislation gave the AWB the authority to receive, handle, and market Australia's wheat crop. The AWB became the sole buyer and seller of Australian wheat and storage, handling, and transportation were provided by each state's bulk hanndling authority (BHA).

Operation of the current AWB stem from legislation established in 1948. Beginning at that time the AWB would be subject to legislation spaning five years with a sunset clause. Thus, a review would be conducted every five years to evaluate the performance of the AWB. Legislation was under the auspices of the "Wheat Industry Stablilization Acts" of 1954, 1958, 1963, 1968 and 1974, and the Wheat Marketing Acts of 1979 and 1984. The current legislation expires with the 1988/89 crop marketing year. Thus, there is currently an Industries Assistance Committee (IAC) investigation reviewing the performance of the Wheat Industry (highlights of this IAC are discussed at the end of this section). A new wheat marketing act will have to be legislated prior to the 1989/90 marketing year. Complementary legislation in each state is also required for the AWB to operate on a national basis.

The current AWB has a broad objective and a number of statutory functions (AWB submission to IAC). The broad objective of the AWB is to:

> perform its functions with the objects of securing, developing, and maintaining markets for Australian wheat and maximizing the return to growers from the marketing of Australian wheat.

This object should be made in consultation with the Grains Council of Australia (an organization representing growers). Specific statutory functions of the AWB are:

(a) to control: (1) the marketing of Australian wheat within the States and Territories, (2) the interstate marketing of Australian wheat, (3) the overseas marketing of Australian wheat, and (4) the export of wheat from Australia

(b) in appropriate circumstances, to import and market overseas wheat within Australia;

(c) to encourage and promote the sale and use of Australian wheat, both within Australia and overseas;

(d) to cooperate, consult and enter into argreements with, and make recommendations to, the bulk handling authorities (BHAs) authorized to receive wheat on behalf of the AWB;

(e) after consulting the BHAs, to determine standards: (1) for the receival and classification into grades of wheat delivered to the AWB, (2) for categories of wheat containing one or more classes and grades of wheat, and (3) for the condition and quality of wheat outturned to buyers by the BHAs;

(f) to encourage, fund and arrange the conduct of research relevant to the marketing of wheat; and

(g) to provide advice and recommendations to the Commonwealth and States relating to the marketing of wheat.

In the meeting the above objective and functions the AWB has a number of powers. Selected powers of interest include:

(1) to enter into tripartite barter arrangements;

(2) to arrange for third parties to provide finance to wheat buyers;

(3) to contract for, or charter vessels for the carriage of wheat by sea;

(4) to arrange for, or establish, maintain and operate facilities for, the overseas storage and handling of wheat;

(5) subject to the approval of the Minister, borrow to raise moneys; and

(6) subject to the guidelines determined by the Minister--enter into a deal with; corn and wheat commodity futures contracts, currency futures contracts, forward exchange contracts, interest swaps and combined currency and interest swaps; for hedging purposes.

The Board is comprised of a full-time chairman, a part-time commonwealth Government representative, five wheat growers, and four specialists (one of whom is a wheat grower). The important points from the above discussion are that the AWB has a statutory objection to maximize returns for growers, the Board itself is controlled by growers, important functions are given to the AWB for purpose of meeting the objective, and a number of powers are given the AWB to facilitate its operation.

Operationally the AWB virtually controls all aspects of wheat marketing. With the exception of domestic stockfeed sales, all wheat must be delivered by growers to the AWB. The AWB authorizes a sole Bulk Handling Authority (BHA) in each state for purposes of handling, and storage, and negotiates rail rates for purpose of transport. The BHA's essentially provide the physical functions of storage and handling at country and export terminals for the AWB. The AWB is the sole seller of wheat to both the processing industry (non-stockfeed), and exports. Most of the exports are made directly by the AWB, but in some years up to 30 percent may be made to private traders for re-export. The AWB also operates a price pool for purposes of facilitating purchases from producers.

B. Quality Control by the AWB

One of the important functions of the AWB is the establishment of standards for receival and classification of wheat into grades (see Section D in the previous section). Through the receival standards, variety control and marketing arrangements the AWB virtually controls the quality of wheat throughout the marketing system. This control has an influence on variety development, release, and selection.[4] Indeed Australia has developed a reputation for wheat which is dry, clean, and insect free, uniform, and promotion materials exploit these points.

The receival standards have the potential to change through time, but in recent years there has been minimal change. There are five dominant classes of wheat produced in Australia including: Australian Price Hard (APH), Hard (AH), Australian Standard White (ASW), General Purpose (GP), and Feed. In addition, classes exist for durum and soft, but due to limited production and export are not discussed further in their report. APH and AH are bread making wheats segregated primarily by protein level--APH is 13-15 percent, AH is 11-14 percent depending on variety. ASW is a multi-purpose wheat with intermediate hardness and protein--normally 9-11.5 percent. GP comprises the same varieties as the other classes but are inadequate in terms of test weight, weather damage, or unmillable material. GP wheats can be used as lower grade milling wheats. Feed wheat is a default class and is only suited for feed purposes. In addition to classes, locations (by state) can be specified to account for the fact that the same class produced in different states may have different performance characteristics.

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[4] Greater detail on this topic is provided in Section V.

Receival Standards

One of the tools used by the AWB for quality control is the "Receival Standard." These essentially comprise what may be referred to as grade standards in other countries. However a slight difference is that all wheat is inspected and an official grade determined at the point of first sale, which forms the basis of the financial transaction between the AWB and grower. An underlying idea in the Australian marketing system is that if tight standards are applied at the first sale, most problems associated with quality are mitigated. By having rigid unmillable material standards at the point of first sale, for example, gives incentive for harvesting clean wheat and precludes problems further downstream in the marketing system.

The same receival standrds apply to all states, but end-use performance of a class may vary by point of export. Thus, state may be referenced as a quality descriptor in export transactions. The receival standards for 1987/88 are shown in Table 3.1. Greater detail and administration of the standards are provided in Section VI. There are two categories each for AH and GP, depending on protein level, falling number and the level of defects. It is of interest to note however, that the tolerance level for some factors are the same across classes. For example the level of millable material is the same across the top four grades. The tolerance for moisture, insects and contaminants are the same across all classes and categories. Important grade determining factors include protein, vareity (discussed below) and the extent of damage (e.g., falling number, defects). In general, wheat with excessive damage are classed as GP or Feed. Given the classes listed in Table 3.1, wheat is further segregated by protein within the classes APH and AH (and

TABLE 3.1. PRINCIPAL CLASS AND GRADE DETERMINING FACTORS FOR AUSTRALIA WHEAT, 1987/88

Factors	APH	Hard		ASW	General Purpose		Feed
		No. 1	No. 2		No. 1	No. 2	
Test weight (kg/hl)	74	74	74	74	71	68	62
Moisture content % max.	12	12	12	12	12	12	12
Protein min. (11% moisture basis)	12.8	11.5	11.0	NA	--	--	--
Falling no. min.	350	300	250	NA	300	200	--
Unmillable material[1] max %							
Total	7	7	7	7	15	25	50
Below screen	5	5	5	5	10	15	30
Small foreign seeds							
Below screen	1	1	1	1	5	10	20
Defective Grains							
Sprouted grains max.%	2	2	5	nil	nil	1	--
Fungal strained grains max.%	5	5	10	5	10	50	50
of which fusarium	2	2	2	2	5	5	5
Dry green, sappy green, and frost affected grains affected by disease or drying	1	1	2	1	10	20	--
Heat damage	nil	nil	nil	nil	nil	nil	--
Ball smut	nil	nil	nil	nil	nil	nil	--
Insect damage	1	1	1	1	2	2	4
Grain contaminents[2]							
Sticks, stones, earth and sand	nil	nil	nil	nil	nil	nil	nil
hive insects	nil	nil	nil	nil	nil	nil	nil
Dead insects max. per 1/2 litre	5	5	5	5	5	5	5

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[1] Materials passing through a 2 mm screen and/or material other than wheat wheat kernels remaining on top of screen after serving.

[2] Other units exist specifically for chemicals, ergots, and seed.

there is a proposal to do so within ASW as discussed below). These segregations include 13, 14, and 15 percent protein in APH, and 12 and 13 percent in AH.

Should a load of wheat not meet these standards it cannot enter the marketing system. As a result, combined with the wide price differentials below, there is tremendous incentive to minimize at least the level of unmillable material at the farmlevel. It is not uncommon for growers to have a "second" screen (or double header) installed on their combines equal to that of the receival standards (2 mm) to be certain there are not excessive levels of nonmillable materials.

The AWB has the ability and responsibility to make changes in the standards through time as deemed necessary by production and market conditions. Traditionally the ASW class was sold as FAQ (Fair Average Quality) in the early 1970s. Since then the grading system has evolved to reflect increased segregation. There are a number of changes which have occurred in recent years. First, the list of approved varieties (discussed below) changes through time to reflect variety availability, and experience with marketing particular varieties. A variety may change classes between years. There were several differences which existed in the administration of the standards in 1984/85 and 1985/86 (see Appendix B for standards from crop years 1984/85 -1987/88). In those years discounts were built directly into the standards for excessive millable material, other foreign seed, ergot and sprout damage. However, these discounts only applied to the GP class.

Price Differentials

The receival standards described above facilitate segregation into relatively homogeneous categories, and therefore aids the AWB in its sales and marketing programs. An important tool of the AWB in quality control is the use of price differentials for different classes and categories of wheat. This is the mechanism used to reflect market signals to producers. A detailed description of the pricing mechanism is provided in the section below. However, of particular importance here is the differentials between classes. The interim advance payment (90 percent of the Preliminary Guaranteed Price) for the different classes in 1987/88 are:

	$/A	Percentage of ASW
APH	137.87	113
AH No. 1	126.15	104
No. 2	121.59	100
ASW	121.59	100
GP No. 1	115.07	95
No. 2	92.93	76
Feed	89.03	73

These are the prices received by producers at the time of first sale. Final payments, and payments for protein within APH and AH, are a result of pooling and discussed in the following section. The point is that there are premiums for qualities above ASW, and fairly substantial discounts for grades less than ASW. This is ultimately the mechanism of the AWB which reflects incentives for improving quality, or precluding quality deterioration.

Variety Control

An important aspect of quality control in the Australian wheat industry is the Variety Control Scheme (VCS) which is administered by the AWB. The VCS is discussed here as it applied to the receival standards and pricing, and Section V provides a complete discussion of the variety development and release mechanisms. The receival standards applied by the AWB are essentially physical characteristics which are easily measured, and with the exception of protein do not directly reflect end use characteristics. There are at least three end use characteristics--grain hardness, flour milling, and dough processing characteristics--which are important and vary by variety and region of production. Since these cannot be measured easily the VCS was implemented to facilitate segregation. The VCS essentially is used to provide incentives/disincentives to producers, and for variety identification. The latter is a prerequisite for segregation and marketing.

The VCS is not regulatory, but is used to identify varieties which is then used, in conjunction with protein and physical characteristics, for classification and pricing. Each year prior to planting the AWB lists varieties by region (Silo groups within each state) which will be eligible for each class. Where appropriate discounts for certain varieties grown in certain silo groups are listed. A separate list is published for each state. Producers then choose varieties for seeding based on agronomic and price differences.

An example of the variety discount list for 1988/89 in NSW is shown in Table 3.2. Several points are of interest. Only certain varieties in specified silo groups are eligible for APH or AH. Some varieties may be AH or ASW in the same silo group, depending on the protein level, but ASW in other silo groups regardless of protein. Some varieties may have discounts ($3 or $5/mt) if grown in some silo groups. For example, Hartog would receive a $3/MT discount for ASW if grown in silo group 4, 5, or 6. Unregistered varieties, in addition to any red wheat, are classed as feed wheat. In Victoria, only certain varieties grown in silo group A are eligible for AH. All others are ASW, feed and/or are subject to discounts.

Enforcement of the VCS requires some mechanism of variety identification at the point of first-sale. However, most varieties are not easily visually distinguishable. To resolve this problem the AWB uses an

Table 3.2. New South Wales, Varietal Discount List 1988/89

NOTE:

1. Varieties marked in **bold** are those approved by the New South Wales Standing Advisory Committee on Wheat for sowing in each particular Silo Group. For detailed information on approved varieties, including the disease resistance of varieties, growers should consult the Department of Agriculture.
2. All deliveries are subject to normal receival standards. Varieties discounted at $3 and $5 per tonne will be received into the ASW Class, if the sample satisfies the ASW standard.
3. Only varieties listed for Prime Hard (PH), Australian Hard (AH) and Durum (DR) will be received into these Classes.
4. Registered varieties are those which are entered in a register maintained by the Registrar of Cereal Cultivars in Australia.

WHEAT VARIETY	**SILO GROUP**				
	1 & 2	**3**	**4**	**5**	**6**
Banks	**PH/AH/ASW**	**PH/AH/ASW**	**AH/ASW**	**AH/ASW**	**AH/ASW**
Comet	**AH/ASW**	**AH/ASW**	ASW	ASW	ASW
Condor	AH/ASW	AH/ASW	AH/ASW	AH/ASW	AH/ASW
Corella	$3	$3	ASW	**ASW**	ASW
Diaz	AH/ASW	AH/ASW	ASW	ASW	ASW
Eagle	$3	$3	$3	$3	$3
Egret	$5	$5	$5	$5	$5
Gatcher	**PH/AH/ASW**	**PH/AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Grebe	GP2	GP2	GP2	GP2	GP2
Harrier	AH/ASW	**AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Hartog	**PH/AH/ASW**	**PH/AH/ASW**	$3	$3	$3
Kamilaroi	**DR**/FEED	FEED	FEED	FEED	FEED
Kite	**AH/ASW**	**AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Millewa	$3	$3	ASW	ASW	ASW
Olympic	$3	ASW	**ASW**	**ASW**	ASW
Osprey	AH/ASW	**AH/ASW**	**AH/ASW**	**AH/ASW**	**AH/ASW**
Quarrion	$3	ASW	ASW	ASW	ASW
Rosella	$3	ASW	**ASW**	**ASW**	**ASW**
Skua	AH/ASW	AH/ASW	**AH/ASW**	AH/ASW	**AH/ASW**
Sunbird	ASW	**AH/ASW**	**AH/ASW**	**AH/ASW**	**AH/ASW**
Sunco	**PH/AH/ASW**	**PH/AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Sundor	AH/ASW	**AH/ASW**	**AH/ASW**	**AH/ASW**	**AH/ASW**
Suneca	**PH/AH/ASW**	**PH/AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Sunelg	**AH/ASW**	**AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Sunkota	**PH/AH/ASW**	**PH/AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Sunstar	**PH/AH/ASW**	**PH/AH/ASW**	**AH/ASW**	**AH/ASW**	**AH/ASW**
Takari	**AH/ASW**	**AH/ASW**	AH/ASW	AH/ASW	AH/ASW
Vasco	**AH/ASW**	**AH/ASW**	ASW	ASW	ASW
Vulcan	AH/ASW	**AH/ASW**	**AH/ASW**	**AH/ASW**	**AH/ASW**

Enquiries regarding the status of varieties not listed above should be directed to the Board's State Manager or growers may consult a Master Variety List at their normal receival point.

SOURCE: AWB "Chairman's Letter, No. 46, October 1987.

affidavit system. Upon delivery to the country elevator producers must declare the variety and sign an affidavit indicating the name of the variety. Based on this declaration wheat is classed and segregated. There are three mechanisms used to enforce the integrity of the affidavit mechanism. First, penalties (including financial and prison) could be imposed if the AWB could prove a false declaration.[5] Second, the AWB conducts spot check using electrophoresis, and these have a high profile--at least the intent. Third, there is peer pressure (at least alleged) amongst producers that violation would eventually degregate the reputation of Australian wheat, thereby resulting in longer-term negative consequences.

Other Quality Control Mechanisms

Of formost importance in quality control is that of the receival standards, the associated variety control scheme, and the use of price differentials. However, there are several other complementary functions and institutional relationships used by the AWB for quality control which are described here briefly.

In each state there is one Bulk Handling Authority (BHA) which is authorized to receive, share and handle wheat for the AWB. These BHA's are fully integrated from the country elevator and include the export terminal (greater detail of the operations is provided in Section IV). Wheat, once received into the BHA is the property of the AWB which contracts for standards of operations which influence grain quality. In addition, most of the wheat is sold and delivered at harvest with very little being stored on-farm with post-harvest delivery. An important institutional relationship exists between the AWB and the BHAs which facilitate quality control is that of logistical coordination of quality requirements. Each BHA submits a weekly composite sample of wheat by location (and silo) to the AWB. This is then subjected to more extensive quality evaluation. Through this process the AWB knows the physical and end-use characteristics of wheat throughout the marketing systems. In addition, at least for the prinicpal buyers the AWB knows their quality requirements. Through this process the AWB is capable of coordinating shipping and loading orders to meet buyer specification. At the extreme this could entail segregations within a class for particular buyer needs.

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[5] However, prosecution is difficult because under current rules the AWB would prove the producers "had intended" to produce and deliver another variety.

Essentially there are only two transactions in the Australian wheat market--one between the grower and AWB, the other between the AWB and importer. In the middle of this transaction is the AWB who through coordination with the BHAs, has tremendous control over quality. As a result the benefits of restrictive quality control can be directly captured. For these reasons there is generally limited blending between grades and loading to factor limits as would be the case if there were multiple transactions, each of which would require quality evaluation subject to grade limits.

The AWB is responsive to market needs in setting receival standards and relative prices. As an example, the AWB is currently in the process of experimenting with further segregation. ASW received as AWB in the past has not been segregated on the basis of protein. Consequently, payments to producers of ASW received essentially an average price thereby masking any implicit values associated with protein, and providing a disincentive to maintain or increase protein levels. In addition, lack of protein segregation in ASW created problems in marketing. During the same time period there have been declining levels of average protein in ASW, and the world market has placed greater importance on protein level. As an example, the

USSR has become the most important market, and they have indicated to the AWB that "we are not interested in low protein ASW." In fact in early December 1987, the USSR apprently told the AWB that 12 percent would be the minimum acceptable protein level, but only 20-30 percent of the ASW crop is above 12 percent protein, thereby limiting market growth in this now very important market (Financial Review, December 9, 1987).

In an attempt to rectify this long-term trend the AWB has introduced a "Quality Testing Pilot Scheme." The purpose of this is essentially to try to avert the apparent long-term decline in protein, and encourage production of high protein wheat. To that end eventually the AWB wants to segregate by protein within the ASW class, and make payments reflect the protein level. Following is the timetable of planned implementation:

1987/88 - pilot testing system to collect data and experiment with equipment (they plan to use whole grain analysis)

1988/89 - payment incentives could be introduced as early as 1988/89 depending on success of the trials in 1987/88

1989/90 - implement a complete data testing system and payments for protein within ASW

The purpose of this scheme is to give growers an indication of market signals, in the case of protein market. In addition, in a recent letter to growers from the AWB strongly suggested that differential payments may also be introduced for moisture and foreign material.

C. Producer Pricing and Policy

Prices received by producers are pooled across the returns from sales and are net of all costs associated with handling, transport, finance, and sales. The principal policy regarding price and income in Australia is the Guaranteed Minimum Price (GMP). Operations of the GMP and pooling are integrally related and do have an impact on the signals transmitted in the marketing system regarding quality. Those topics, as well as the derivation of local prices and a description of producer marketing alternatives are described in this section.

Guaranteed Minimum Prices

Current operations of the GMP began in 1979, however, similar price stabilization schemes have existed since 1948. The GMP essentially is a mechanism which provides a price floor for producers during a particular marketing season. In general the GMP reflects returns from past marketing seasons and those expected during the current marketing season. Specifically, the GMP is defined as the higher of the two amounts (Industries Assistance Commission p. 28):

- 90 percent of the preliminary estimates of the GMP, or
- 95 percent of the average of the estimated growers pool return of the two lowest of the previous three seasons.

In practice, the second procedure is used and deductions are made for estimated interest and administration costs. The GMP then basically reflects a three-term moving average of returns, including those estimated for the current season. The purpose of the GMP is to provide some degree of temporal stability in growers incomes. However, by definition the GMP typically would be biased downwards, given that only 95 percent of the average is taken, and two out of three terms in the avearge reflect low price years.

Operationally, separate GMPs are specified for each of the five categories of wheat, thus allowing a mechanism of transmitting marketing signals regarding quality. By October of each year (just before harvest) preliminary GMP (PGMP) is announced for producers (thus new crop signals are not directly transmitted until after planting decisions had been made). This PGMP is then revised by March of the following year (after harvest) and announced as the Final GMP (FGMP). At the time of delivery which normally occurs at harvest an Interim Advance Payment (IAP), net of deductions, is made which is 90 percent of the PGMP.[6] Adjustments to the IAP are made at the time the FGMP is made and these are referred to as the Final Advance. For demonstration purposes Table 3.3 shows a brief history of the GMPs for ASW and individual classes in the recent two years. In addition, details of the 1986/87 Final GMP are presented in Table 3.4--a year in which the GMP was increased between October and March.

The GMP is underwritten by the Commonwealth. Payments for the Commonwealth are only necessary to the extent market prices fall sharply within or between years. Given that past years minimum prices are incorporated in derivation of subsequent GMPs, then minimal assistance should be required in succeeding years if world prices continue to fall. The marketing season 1986/87 is the first year in which a payment will be required from the Commonwealth. During this time period there was a nearly 40 percent drop in ASW asking prices between April and July 1986, coinciding with reductions in the U.S. loan rate. As a result the Government's contribution will likely be in the order of $220 million, which cannot be confirmed until after the pool is closed.

Underwriting of the GMP has one important purpose, but also a very important indirect result. The primary purpose of underwriting is to allow an advance payment scheme and price stabilization plan. An important result of this is that borrowing costs of the AWB are reduced by this government guarantee of the GMP. Without the payment guarantee, interest costs would be

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[6] At one time only 40 percent of the GMP was paid in advance.

TABLE 3.3. GUARANTEED MINIMUM PRICES, 1976/77-1987/88

Year	ASW	APH	AH No. 1	AH No. 2	GP No. 1	GP No. 2	Feed
	$A/MT						
1976/77	66.0						
1977/78	66.0						
1978/79	75.00						
1979/80	114.71						
1980/81	131.92						
1981/82	141.55						
1982/83	141.32						
1983/84	150.00						
1984/85	145.35						
1985/86	149.87						
1986/87	139.83	157.62	142.69	--	128.21	117.79	105.77
1987/88*	135.10	153.19	140.17	135.10	127.86	103.76	98.92

*PGMP

TABLE 3.4. DERIVATION OF FINAL GUARANTEED MINIMUM PRICES, 1986/87

Category	Final GMP	Preliminary GMP	Interim Advance*	Final Advance**
	($/MT)			
Prime hard	157.62	148.62	133.76	23.86
Hard	147.69	135.62	122.06	25.63
ASW	139.83	130.62	117.56	22.27
GP1	138.21	119.62	107.66	30.55
GP2	117.79	100.62	90.56	27.23
Feed	105.77	85.62	77.06	28.71

*Interim advance = 90 percent of preliminary GMP.
**Final advance = final GMP - interim advance.

greater and/or inventories may have to be valued at a lower level. Given the AWB borrows large amounts of money to finance advance payments and inventories, underwriting of the GMP has important indirect benefits in terms of favorable borrowing costs.

Pooling. A fundamental principal of the AWB which has existed in some form since 1948 is that of price pooling (pooling of handling costs are discussed in Section IV). There are two objectives of price pooling. One is to increase returns by selling through a monopoly (i.e., the AWB). Second is to share risks across growers. Through the use of pooling and underwriting of the GMP, the AWB can easily make advance payments even though sales and pricing typical accrue over succeeding months.

Producers are paid 90 percent of the PGMP at delivery, net of direct costs of transport and handling. Thus, the PGMP is essentially basis a FOB ship position. In succeeding months wheat is priced and shipped. Receipts from credit sales are received over extended periods. From these revenues operating, interest and administration costs as well as the Interim Advance Payment are deducted. The balance is paid producers in the form of "Subsequent Payments." Table 3.5 shows the pool payments reported in the AWB 1985/86 Annual Report.

All producers receive the same average price regardless of the time of delivery. In fact given the IAP is made within 21 days of delivery there typically is a disincentive to not deliver concurrent with or as soon as possible after harvest. However, prices do vary to some extent by quality in several ways. First the IAP varies by class as indicated in the previous section. Higher quality wheats receive higher IAPs. In addition separate pools are maintained by grade, and protein level within APH and AH.

Subsequent payments can vary across producers depending on the protein level, or class--see "Pool Equities" in Table 3.5.

As with any price pooling scheme, problems necessarily develop and in the case of Australia are well documented in the recent IAC investigation. Two problems of particular interest are highlighted here. First, given that prices do not differentiate by time of sale, there is generally no incentive for post-harvesting delivery to the BHA. As a result, there is limited on-farm storage, but extensive storage and conditioning facilities at the country and export elevators. Second, even through there are payment differences across classes, 70 percent of the wheat is ASW in which at least currently within class segregations and price differentials do not exist. As a result price signals across protein are disguised within this grade. This problem has been recognized by the AWB as discussed above, and are in the process of initiating procedures to resolve it.

Producer Prices and Marketing Alternatives

Actual prices to producers are comprised of the net price at the time of delivery plus all subsequent payments as discussed above. The net price at the time of delivery is derived as the Interim Advance Payment which varies by class, net of a number of charges associated with grain handling, storage, transport, and miscellaneous charged. As an example, the figures below show the typical derivation for the net price to producer in ASW for the delivery of ASW.

Interim Advance Payment ASW		126.15
Freight	23.00	
Storage and handling	16.20	
Research levy	.50	
Carry-over cert.	.40	
Outward Wharfage	1.78	
Ceres house	.30	
	42.68	
		$ 83.47/MT

TABLE 3.5. POOL PAYMENTS AND DATES OF PAYMENT[1]

	80-81 Pool	81-82 Pool	82-83 Pool	83-84 Pool[2]	84-85 Pool[2]	85-86 Pool[2]
GMP	30/11/80 131.92	1/12/81 141.50	1/12/82 141.32	1/10/83 150.00	1/10/84 145.35	1/10/85 149.87
Subsequent Payments						
First	25/1/83 4.50	16/4/84 6.00	18/1/84 4.00			
Second	31/3/83 2.50	7/6/84 2.37	30/3/84 2.50			
Third	16/6/83 2.50		18/5/84 5.00			
Fourth	27/9/83 2.50		10/7/84 5.00			
Fifth	16/4/84 3.50		28/9/84 2.50			
Sixth			29/3/85 2.50			
Seventh			17/9/85 7.50			
Eighth			9/4/86 3.50			
Ninth			31/7/86 4.48			
Pool payments to date[3]	147.42 148.56	149.92 151.44	178.23 179.53	150.00 150.00	145.35 145.35	149.87 149.87

SOURCE: Australian Wheat Board, Annual Reports, various issues.

[1] ASW basis; prior to deductions for bulk handling, freight, dockages, wheat tax, and wheat levies.

[2] Not finalized at September 30, 1986.

[3] All states except Western Australia.

[4] Western Australia (this difference reflects a WA freight advantage to certain markets).

Pool Equities (AWB Chairmen'sletter, October 1987).

1983/84 equity estimated at $5.00/MT for APH, AH, and ASW.
1984/85 equity estimated at $10.00/MT.
1985/86 equity estimated at $7.00 for ASW, APH, and AH, $3/MT for GP and feed.
1986/87 unlikely to have estimated pool payments.

A brief description of each component is given here, but greater detail is provided in Section IV.

The freight charge is the average in 1987 for NSW shipping point, however, prices vary by location. Storage and handling costs include both country and export terminal storage and handling. These are pooled costs and are the same across growers regardless of incidence. The research levy is a contribution to a research fund which is administered through the Ministry of Primary Industries. Carryover costs are associated with financing storage between crop years. Outward wharfage is for maritime pilots. The Ceres House charge is to finance the AWB building.

With the exception of freight, all these costs are the same across users within a state. Differences between states do exist reflecting differences in freight and storage and handling costs. In addition to the above subsequent payments usually occur, the size of which varies across crop years, as well as to some extent by class and protein level.

Producers basically have four marketing alternatives including: (1) immediate delivery to the BHA; (2) deferred delivery to the BHA; (3) on-farm use for stock feed; and (4) grower-to-buyer sale to domestic stock feed. By far the most common alternative is that of immediate delivery to the BHA, normally concurrent with harvest. In this case extensive on-farm storage is not required and payment is received normally within 3 weeks. One constraint to this option is that of waiting time at receival points, which if excessive may justify at least minimil use of temporary on-farm or field storage.[7]

The deferred delivery option was introduced to facilitate the needs of some producers who don't deliver immediately at harvest. Under this scheme delivery can occur between 2-14 weeks after a prescribed date for various delivery points. These dates may be as far forward as May of the marketing season. Accrued interest on the Initial Advance Payment is paid producers, but storage and other opportunity costs are not.

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[7] In the state of Victoria elevator system during 1986/87, as an example, harvest deliveries into the system reached a peak of 200,000 MT/day in December, decreased to 10,000 MT/day in January, and nil after the middle of February.

Producers may store wheat on-farm for purpose of using as feed. Or, an alternative exists to bypass the AWB and BHA's and make direct grower-to-buyer sales to the domestic stockfeed industry. This market is essential a nonboard market and often is facilitated by the private traders.

The options above are general but do illustrate the alternatives for growers. To put these into perspective though growers may store for feed, or sell directly for domestic feed, these are extremely small markets (prior to introduction of the grower-to-buyer option for domestic stock feed the AWB sold 800,000 MT into this market). The disposition of the crop is ultimately determined by the underlying economics which encompasses quality, and storage cost and availability. Given that producers are implicitly charged a storage cost by the BHA, regardless of time of delivery, inevitably delivery at harvest is preferable unless there are other anomolistic circumstances. As a result relatively little on-farm storage capacity has developed in Australia compared to other countries. In turn, extensive storage takes place primarily at country elevators and to a lesser extent at export elevators.

D. Export and Domestic Marketing

As indicated above an overall objective of the AWB is to maximize returns of growers. To that end other procedures used for domestic sales differ from those of export sales. In addition there are a number of longer term strategic tools used by the AWB. Critical to pricing is the "Card Price," at least for the domestic market and to some extent the export market. Each of these topics are discussed in this section.

Card Price

Alledgelly the AWB prices its wheat in competition with comparable wheats produced by other exporters. In the absence of a local cash market the AWB derives and publishes a "Card Price" on a daily basis. These are ultimately related to a formula (though likely variable) relative to competitor prices. The card prices are quoted for each of the four principal qualities, for nearby as well as deferred shipment.

An example of the card price for nearby shipment in early December are shown in Table 3.6. Price differences quoted for each class are approximately proportionately equal to relative advance payment prices, which is effectively the purchase prices. Also for comparison purposes, annual average card prices are shown in Figure 3.1 with comparison to that of U.S. HRW.

The card prices are apparently tied to those of competitors, but primarily those of the U.S. Discussions in December 1987 indicated that APH prices were $5-8/MT over those of U.S. Hard Red Winter at the Pacific Northwest. Those for AH were $3/MT over. The price of ASW was 50-80¢/MT over a combination of US Gulf and PNW prices. In 1986/87 the AWB estimated that 15 percent would be sold at full card price but in 1987/88 up to 25 percent would be priced at the card price. This increase alledgedly reflects the reduced export availability in 1987/88.[8]

Domestic Sales

Sales mechanisms of wheat into the domestic market vary depending on end-use. Stockfeed sales currently are dominanted by direct grower-to-buyer transactions. These are often facilitated by the privte traders. However, in

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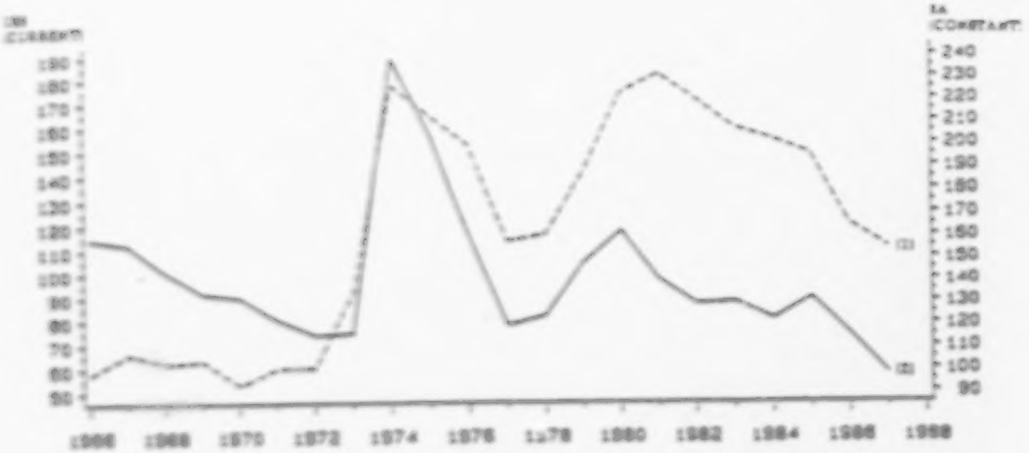
[8] Private traders indicated that Japan is one of the few markets in which the full card price is realized.

TABLE 3.6. CARD PRICES FOR SELECTED DATES FOR DECEMBER 1987 SHIPMENT (U.S. $/MT FOB EASTERN AUSTRALIA)

				APH	
		ASW	AH	13% Protein	14% Protein
December	1	124.50	133.00	142.00	143.50
	2	124.00	132.50	141.50	143.50
	4	125.00	133.00	141.00	143.50
	7	125.50	134.00	140.50	143.50
	8	125.00	133.50	139.50	143.50
	10	125.00	133.50	139.50	141.00



1)U.S. No. 2 HRW, FOB U.S. Gulf.
2)Export price (FOB) for ASW, Deflated by Australian Consumer Price Index (Base 1980).

Figure 3.1. International Wheat Prices: 1973-1986 ($US/Tonne).

SOURCE: Industries Assistance Commission.

total this market is typically less than 1 MMT per year. Domestic sales of wheat used for individual purchases are negotiated and priced directly by the AWB. Sales of domestic wheat for human consumption are controlled completely by the AWB. However, in this case a pricing formula based on the card price is used. The formula price uses the average of the forward price in the two preceeding quarters. To this value is added a $16/MT service charge, and $1.10/MT levy for shipment to Tasmania. The $16/MT service charge is to account for the special services provided by the BHAs over and above these provided by international customers. These include: (1) selection of the best quality--exclusivity; (2) stocks can be reserved for up to 13 months by quantity, quality, and location; (3) storage, and (4) credit--an average of 45 days. Thus, each domestic user pays the same price regardless of intra-class quality and costs incurred. Also, as in other countries the best quality whet is used domestically. An example of export and domestic prices for various uses are shown in Table 3.7.

Export Marketing

The AWB has the responsibility of marketing all of the wheat from Australia with the exception of domestic stock feed. Sales can be made directly by the AWB or the private trade. However, most of the sales are direct cash sales negotiated by the AWB and a number of institutional relationships (strategic tools) are used as part of the marketing mix. First, the AWB has a number of long-term bilateral agreements (LTAs) as shown in Table 3.8. These typically comprise about 3.5-4.0 MMT per year. Second, credit is extended under EFIC (Export Finance Insurance Corporation) which is a credit guarantee of 95 percent of the term for up to three years. The AWB pays the insurance premiums for this arrangement. In 1986/87 credit sales accounted for 27 eprcent of the total wheat exports. A third direct form of

TABLE 3.7. EXPORT AND DOMESTIC WHEAT PRICES

Year[1]	Export[2]	Human Consumption	Stockfeed	Industrial
	----------	---------- A$/MT	----------	----------
1976/77	96.54	105.40[4]		
1977/78	116.48	111.16[4]		
1978/79	137.63	116.61[4]		
1979/80	153.18	130.78	140.50	133.08
1980/81	152.05	156.12	151.37	151.67
1981/82[6]	152.50	187.20	149.78	151.15
1982/83[7]	179.20	203.46	184.11	174.16
1983/84[7]	152.16[5]	219.41	175.24	170.34
1984/85[7]	145.32[5]	210.73	204.36	199.09
1985/86[7]	127.29[5]	213.89	193.82	188.39

SOURCE: Australian Wheat Board Annual Report, Various Issues.

[1] December 1 to November 30.
[2] Simple averages of daily asking prices for ASW.
[3] Stockfeed and industrial prices do not include the Tasmanian Freight Levy from 1979-80 to 1983-84 inclusive.
[4] Prior to 1978-79, domestic prices were not differentiated.
[5] From December 1983 prices quoted in U.S. $.
[6] December 1, 1981 to September 30, 1982.
[7] October 1 to September 30.

TABLE 3.8. LONG TERM AGREEMENTS

Country	Annual Quanity	Supply Period
Abu Dhabi	Minimum 70,000 tonnes	Jan. 1985-Dec. 1987
Egypt	Minimum 1.5 million tonnes (Minimum 10 million tonnes over 5 years)	Jan. 1985-Dec. 1989
Iraq	Minimum 800,000 tonnes (Minimum 6 million tonnes over 5 years)	Jan. 1986-Dec. 1990
Republic of Korea	Minimum 35,000 tonnes	May 1986-Dec. 1986
Yemen AR	Up to 400,000 tonnes	Jan. 1986-Dec. 1986
Japan (Supply Agreement)	900,000 tonnes	Jan. 1986-Dec. 1986

aid is that provided to Egypt. In 1985/86 the AWB in conjunction with other Australian agencies assisted Egypt in construction of a 20,000 MT storage facility to aid in the transition to bulk receival and handling. In 1985/86 Egypt accounted for 14-1/2 percent of total sales. Food aid from Australia comprises a relatively small amount as shown in Table 3.9. In recent years up to 98 percent of total sales were commercial. The AWB does not directly participate in countertrade. However, they have indirectly supported its use in at least one transaction through the private traders. The AWB has indicated to the IAC that a change in legislation would facilitate increased use of countertrade.

The AWB maintains an integrated sales and marketing strategy. For each customer this encompasses pre-sales, sales, and post-sales service. These are promotional as well as technical and emphasize the quality advantage of Australian wheat. A five year marketing plan concurrent with AWB legislation is maintained with 40 countries. These are categorized with respect to quality needs and price and form the basis of the marketing plan.

Export quality specifications generally coincide with the class structure of the receival standards. However, as recent as the mid-1970s an FAQ system was used. Since then increased class specificity has allowed greater specification with respect to quality. A standard AWB contract is used typically with reference to classes and grades (See Figure 3.2). In addition, minimum protein levels are specified for APH, AH, and at least 50 percent of the ASW contracts. The port, or state, is also specified/negotiated in many cases to account for transport cost differentials, availability of quantity and quality, and inherent quality differences at each port. However, though capable, the AWB is reluctant to export on specifications other than those typically included in the receival standards.

TABLE 3.9. EXPORTS OF COMMERCIAL AND FOOD AID WHEAT AND FLOUR (000 MT)

Year[1]	Commercial Wheat	Food Aid Wheat	Commercial Flour[2]	Food Aid Flour[2]	Total
1976/77	9,355	147	224	37	9,763
1977/78	7,726	192	129	51	8,098
1978/79	11,199	327	134	33	11,693
1979/80	12,828	221	124	24	13,197
1980/81	9,123	328	110	53	9,614
1981/82[3]	10,445	445	118	60	11,068
1982/83[4]	7,057	100	73	50	7,280
1983/84[4]	13,741	328	49	34	14,152
1984/85[4]	14,263	307	84	25	14,679
1985/86[4]	15,709	253	51	13	16,026

SOURCE: Australian Wheat Board Annual Report, Various Issues.

[1] December 1 to November 30.
[2] Wheat equivalent. (Conversion factor ÷ 1.29 prior to 1984-85; ÷ 1.27 from 1984-85). Wheat products are included in commercial flour.
[3] December 1, 1981 to September 30, 1982.
[4] October 1 to September 30.

The underlying idea of the Australian marketing system is that if stringent quality, standards are met at receival, the possibilities for degradation throughout the marketing system would be limited. In practice the AWB knows the quality and quantity of wheat by location. In addition, it knows the quality needs of larger specific buyers. Thus, coordination of shipments are intended to match the quality needs of the buyer.[9]

Most of the wheat is sold and negotiated directly by the AWB. This is normally done on a FOB basis, but periodic C&F sales are made. Prices are negotiated either as flat prices, or as basis contracts. The AWB normally reserves certain larger important markets for itself. These are typically markets with government buying agencies, and when the end-use is for nonfeed purposes. These markets include the USSR, China, Egypt, Iran, Iraq, and those in which LTA's are maintained.

The alternative means of direct sales is through the private trade. Typically up to 30 percent of the total exports are made by private multinationals. However, due to the reduced crop in 1987/88, the preferred AWB markets and LTA's, only about 10-12 percent will be exported by the privates. Thus, the privates essentially service the residual. A large proportion of the residual is comprised of Japan--all of which is bought directly from the AWB by the Japanese trading companies for resale to the Japanese Food Agency. As production in Australia decreases, and/or as there is an increase in the "preferred" customers, the trading opportunities for private exporters diminishes.

The AWB sells directly to private traders for re-sale to a third country. The procedure is initiated by the trader who negotiates

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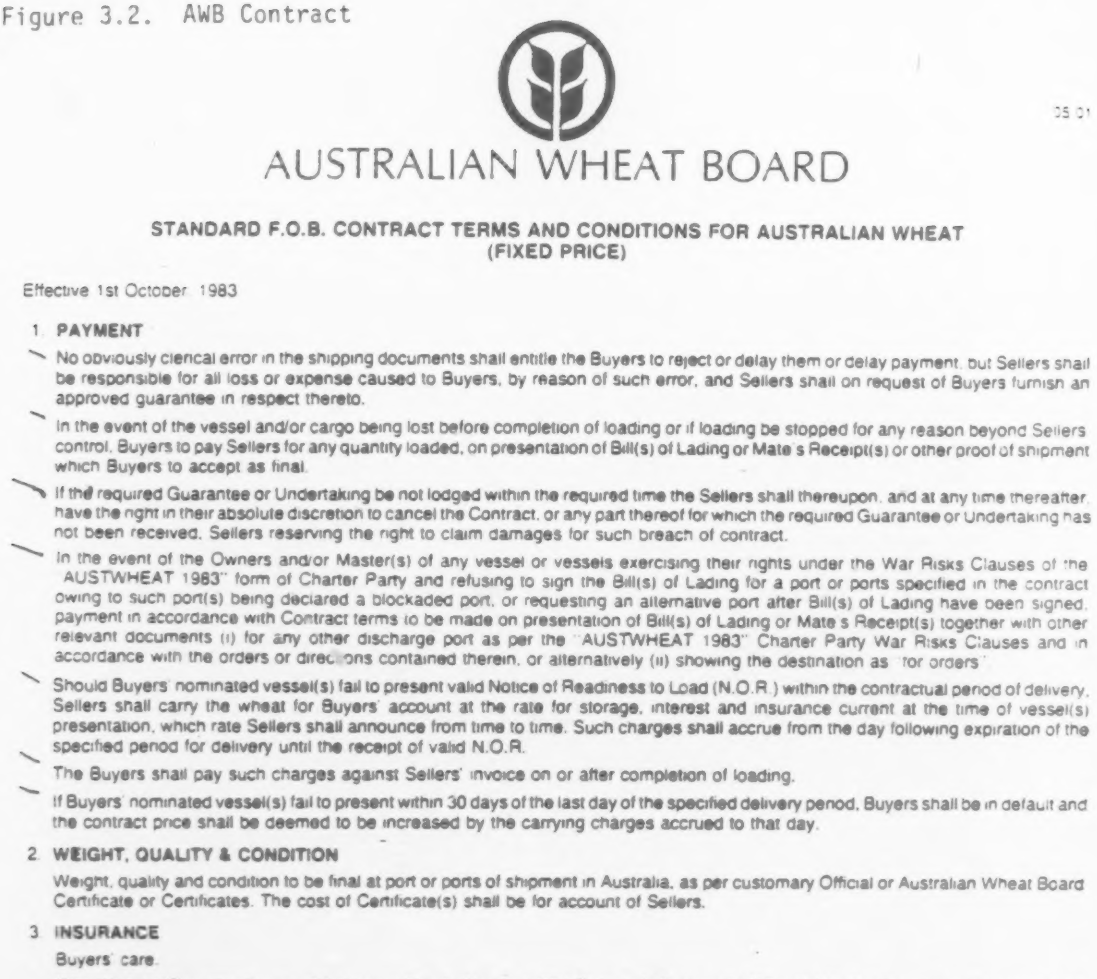
[9] Indeed export terminals tended to receive and bin wheat corresponding to particular quality needs of specific buyers.

Figure 3.2. AWB Contract



05 01

AUSTRALIAN WHEAT BOARD

STANDARD F.O.B. CONTRACT TERMS AND CONDITIONS FOR AUSTRALIAN WHEAT (FIXED PRICE)

Effective 1st October 1983

1. PAYMENT

No obviously clerical error in the shipping documents shall entitle the Buyers to reject or delay them or delay payment, but Sellers shall be responsible for all loss or expense caused to Buyers, by reason of such error, and Sellers shall on request of Buyers furnish an approved guarantee in respect thereto.

In the event of the vessel and/or cargo being lost before completion of loading or if loading be stopped for any reason beyond Sellers control, Buyers to pay Sellers for any quantity loaded, on presentation of Bill(s) of Lading or Mate's Receipt(s) or other proof of shipment which Buyers to accept as final.

If the required Guarantee or Undertaking be not lodged within the required time the Sellers shall thereupon, and at any time thereafter, have the right in their absolute discretion to cancel the Contract, or any part thereof for which the required Guarantee or Undertaking has not been received. Sellers reserving the right to claim damages for such breach of contract.

In the event of the Owners and/or Master(s) of any vessel or vessels exercising their rights under the War Risks Clauses of the "AUSTWHEAT 1983" form of Charter Party and refusing to sign the Bill(s) of Lading for a port or ports specified in the contract owing to such port(s) being declared a blockaded port, or requesting an alternative port after Bill(s) of Lading have been signed, payment in accordance with Contract terms to be made on presentation of Bill(s) of Lading or Mate's Receipt(s) together with other relevant documents (i) for any other discharge port as per the "AUSTWHEAT 1983" Charter Party War Risks Clauses and in accordance with the orders or directions contained therein, or alternatively (ii) showing the destination as "for orders".

Should Buyers' nominated vessel(s) fail to present valid Notice of Readiness to Load (N.O.R.) within the contractual period of delivery, Sellers shall carry the wheat for Buyers' account at the rate for storage, interest and insurance current at the time of vessel(s) presentation, which rate Sellers shall announce from time to time. Such charges shall accrue from the day following expiration of the specified period for delivery until the receipt of valid N.O.R.

The Buyers shall pay such charges against Sellers' invoice on or after completion of loading.

If Buyers' nominated vessel(s) fail to present within 30 days of the last day of the specified delivery period, Buyers shall be in default and the contract price shall be deemed to be increased by the carrying charges accrued to that day.

2. WEIGHT, QUALITY & CONDITION

Weight, quality and condition to be final at port or ports of shipment in Australia, as per customary Official or Australian Wheat Board Certificate or Certificates. The cost of Certificate(s) shall be for account of Sellers.

3. INSURANCE

Buyers' care.

Wheat to be at Buyers' risk upon delivery over the ship's rail, and the Buyers shall insure the Wheat placed on board, or in the custody of the Master, from the commencement of loading until payment in accordance with the contract.

Any general average to be for Buyers' account.

4. FORCE MAJEURE CLAUSE

If any strikes, bans, lock-outs, riots, differences with or between work-men, accidents to or break-down of machinery plant or equipment, delays en route, policies or restrictions of governments, including restrictions of export and other licences, or any other contingency whatsoever beyond Sellers' control, including war, delay the shipment of the wheat or the forwarding of the wheat to the loading point, the Sellers shall not be responsible in any manner whatsoever to the Buyers for any such delay or non-fulfilment traceable to any of these causes, but subject to clause 6 (c).

5. PROHIBITION

In case of prohibition of export, blockade or hostilities or in case of any executive or legislative act done by or on behalf of the government of the country of origin or of the territory where the port or ports of shipment named in the contract is/are situate, restricting export, whether partially or otherwise, any such restriction shall be deemed by both parties to apply to the contract and to the extent of such total or partial restriction to prevent fulfilment whether by shipment or by any other means whatsoever and to that extent the contract or any unfulfilled portion thereof shall be cancelled. Sellers shall advise Buyers without delay with the reasons therefore and, if required, Sellers must produce proof to justify the cancellation.

6. FREIGHT

(a) Buyers undertake to provide the freight, which is to be mutually agreed, to permit shipment to be made in accordance with the Contract

on Liner terms (for quantities less than 5,000 tonnes)

or (for quantities in excess of 5,000 tonnes)

on the terms of the Australian Wheat Charter 1983 — codename "AUSTWHEAT 1983".

Buyers to endeavour to ensure that a copy of the Charter Party is mailed to the Australian Wheat Board, Melbourne, in time to arrive before presentation of performing vessel(s) for loading.

Brief details of each Charter Party, including (a) Place and date of Charter Party, (b) Names of owners or disponent owners, and of charterers (refer lines 2 and 8 of "Austwheat 1983" Charter Party form), (c) Capacity, minimum and maximum in tonnes of 1,000 kilos (refer Clause 5), (d) Loading and cancelling dates (refer Clause 13), (e) Demurrage/despatch rates at loading port (refer Clause 16) to be telexed to Sellers at the time of nominating each vessel.

Amendments to "Austwheat 1983" Charter Party terms affecting loading and loading port(s), including amendments to Clauses

(b) SHIP'S CLASSIFICATION

To be first-class steamer or power-engined ship (excluding Tankers and Vessels which are either classified in Lloyd's Register or described in Lloyd's Shipping Index as "Ore Oil Vessels") classed not lower than 100 A.1 or British Corporation B.S. or top classification in American, French, Italian, Norwegian or other equal Register, or ships not inferior to these classifications.

(c) WITH RESPECT TO CARGO AND PART-CARGO QUANTITIES

Despatch or Demurrage at loading port(s) as per Charter Party to be for Seller's account.

The rate of demurrage provided in the Charter Party shall be within the minimum and maximum rates for the relevant cargo quantity current at the date of the Contract, such rates Sellers shall announce from time to time.

Despatch shall be at half the rate of demurrage.

(d) OIL POLLUTION CLAUSE

The Buyers warrant that the following clause will be included in the charter party/freight engagement of the vessel(s) tendered to load hereunder —

"The Owner agrees to indemnify the Charterer his agents or any other party against any liability which may be imposed on them or which they may incur under any statute regarding liability for pollution of navigable waters by oil, by reason of any contravention of such statute by the ship, the Master or any servant or agent of the Owners provided that such contravention shall not have been caused or contributed to by the party seeking to be indemnified under this Charter and provided that the facts and matters giving rise to the contravention do not constitute a defence under Article 3 Section 2 of the International Convention on Civil Liability for Oil Pollution Damage 1969. The Owners total aggregate liability in respect of any oil pollution incident shall under no circumstances exceed U.S. Dollars 300,000,000 and the extent of the indemnity under this clause shall be limited to the difference between any cost and expenses incurred directly by the Owners and U.S. Dollars 300,000,000. The Owner warrants that the ship is entered in a P and I Association with cover for liabilities arising out of any contravention as aforesaid.

No liability for demurrage shall arise from any delay or loss of time to the vessel at the port(s) of loading and/or discharge caused by any such contravention nor shall any time lost by any such contravention count when calculating despatch".

Furthermore, Buyers shall indemnify Sellers to the extent that Sellers are not so indemnified by the Owners of the said vessel(s) or against any liability for demurrage, or against any loss of despatch, which Sellers may suffer as a result of proceedings or measures undertaken as aforesaid.

(e) I.T.F. CLAUSE

Buyers to include the following clause in (or as an addendum to) the charter party/freight engagement —

"The Owners of the vessel guarantee that the minimum terms and conditions of employment of the crew of the vessel are now or will be prior to presentation of the vessel for loading and will remain for the period of this Charter Party covered by an I.T.F. Agreement or a bona fide trade union agreement acceptable to the I.T.F."

(f) WAR RISK CLAUSE

Should the Owners and/or Master(s) exercise their rights under the War Risks Clauses of the "AUSTWHEAT 1983" Charter Party, Buyers must immediately nominate an alternative port of discharge if and when requested, but such port is to be subject to the approval of any authority, committee or person having rights under and in accordance with the "AUSTWHEAT 1983" Charter Party War Risks Clauses.

7. **SPECIAL CLAUSES**

(i) All costs of stowing and trimming cargo to be for Buyers' account.
(ii) Consular charges, if any, on the cargo to be for Buyers' account.
(iii) If Buyers require any of the documents visaed in Australia, the cost involved to be for Buyers' account.
(iv) Buyers agree to accept documents containing the Chamber of Shipping War Deviation Clause and/or any other recognised official war-risk clauses.
(v) The Charge imposed by the Grain (Export Inspection Charge) Act 1979 shall be for Buyers' account.
(vi) Each shipment to be deemed a separate contract.

8. **CONTRACT MADE AND GOVERNING LAW IN VICTORIA**

In all respects the contract shall be deemed to have been made in the State of Victoria, Australia and governed by and construed in accordance with the laws of that State.

9. **TIME OF ESSENCE**

Time shall in all respects be of the essence of this contract.

10. **ARBITRATION**

All disputes from time to time arising out of this Contract shall be referred to two Arbitrators, one to be appointed by each party. In the event of a difference of opinion between the Arbitrators, such difference shall be referred to an Umpire nominated by the Arbitrators. The Arbitrators shall be commercial men of Melbourne and the Arbitration shall be held in Melbourne.

Any claim by the party alleging such dispute must be made in writing within three (3) months from the date of the relevant bill of lading and the claimant's arbitrator must be appointed within three (3) months from the date of such written notice. In the event of failure to comply within the time prescribed for the giving of the written notice or the appointment of the claimant's arbitrator, the claim shall be deemed to be waived and absolutely barred.

11. **ULIS CLAUSE**

The uniform law on sales and the uniform law on formation to which effect is given by the Uniform Laws on International Sales Act 1967, will not apply to this contract.

with the AWB on price, quality, shipping period, and market [declared as a specific third-country market, or to exclude certain market(s)]. These markets potentially include all those of which are not the preferred customers. However, in practice they typically include South America, the private importers of Southeast Asia (e.g., Malaysia, Indonesia, Thailand, Korea, Sri Lanka, Yerren) and New Zealand and Fiji. In general, to the extent possible, the AWB has sought to limit exporter competition in the same third-country market on the idea that competition would reduce returns to sales. Purchases are made from the AWB on a FOB basis using AWB classes for quality specification.

Industry Assistance Commission

Currently there are two investigations into the grain marketing systems in Australia. One directly relates to that of export marketing and is referred to as the Industry Assistance Commission (IAC). This is a product of the sunset clause discussed above in which new legislation is required every five years for continuing operations of the AWB. This process requires analysis and hearings by the IAC. Selected highlights of the process particularly as they relate to quality are discussed in this section. At this time submissions have been made by the AWB and the Australian Grain Exporters Association (AGEA), and interim recommendations have been made by the IAC.

While the IAC encompasses many broad issues related to wheat marketing and the AWB, there are a number of crucial issues specifically related to wheat quality. The AWB cites a number of advantages of a single seller (Australia Wheat Board, Submission to the IAC) including bargaining power associated with direct negotiation, coordination of logistics, research and others. In addition, specific mention is made that Australia has a reputation for "high quality wheat and meeting exacting quality specifications" (p. 15).

Further at least implicitly this reputation has been garnered and preserved only because of the quality control procedures described in the previous section are administered by a single seller. Citation, of course, has been made to U.S. quality problems which are in part attributed to a private trading system. Alledgedly, centralized control over varieties and hygiene is essential for longer-term advantages, whereas a fragmented approach could lead to short-term trading profits.

The private traders under the auspices of AGEA have prescribed a five-year plan for deregulation of the wheat trading industry. In early years the export feed wheat market and domestic milling markets would be deregulated, and in subsequent years the export wheat market would be deregulated. However, it is of interest that AGEA indicated that current quality standards would be inadequate in a competitive trading environment:

> Other changes would also need to take place to provide for the maintenance of strict quality control. This could be administered by the DPI (Department of Privacy Industries) in a similar fashion as occurs currently with other grains. However, we believe that, for example, a more specific grading system for what would need to be introduced as the current arrangements are considered to be too subjective and unprecise for the maintenance of a strict quality control in a deregulated export and domestic market (Australian Grain Exporters Association p. 10).

Most exporters recognize the hygiene reputation of wheat but generally claim these are market phenomena and the premiums can and should be market determined. Due to the fact that the AWB has not specifically pursued feed wheat markets in longer term plans (including variety development), alledgly development of these markets has been precluded.

The challenge put forth by the IAC in their interim proposals were premised on the suspicion that the AWB unlikely cannot extract premiums. Also, if disbanded, many functions of the AWB would merely be absorbed by wheat boards at the state level. The IAC has placed lesser significance on the prerequisite of a single seller to control grain cleanliness and hygiene. Selected specific proposals in the interim report of the IAC are (Industries Assistance Commission, p. 11):

- the AWB sell wheat to private traders for export to any market, other than a small number of specified markets reserved for the AWB;
- the permit system for sales of feedwheat be extended to cover wheat for any domestic end-use;
- consideration by given to the further disaggregation of revenues and associated costs currently covered by the AWB's pooling arrangements, to enable payments to growers to reflect more closely actual market returns and costs;
- the price underwriting arrangement be terminated.

In addition, the IAC has sought comment on alternatives to the advance payment system, criteria for determining which markets should be reserved for the AWB, and all aspects of variety control (Industries Assistance Commission, p. 12). Though these recommendations may appear bold, they may be merely interpretted as challenges to participants (e.g., AWB, and AGEA) in the next stage of submissions and hearings. To put the IAC into perspective, these are merely proposed recommendations and do not constitute policy. The next step in the process is political. In past IAC inquiries, only minimal recommendations have been accepted in the political process.

IV. Grain Handling in Australia

There are a number of unique attributes in the grain handling and transport system which affect the quality of wheat being exported. These include: (1) limited on-farm storage, but extensive storage throughout the market system (2) state monopolies generally in both grain handling and transportation, and (3) the AWB takes ownership at the point of first sale and retains ownership until the point of export. The organizational and operating practices of the grain handling and transport industries are discussed in this section, with particular attention to the attributes which impact quality. In the first section an overview is provided. The remaining section provide a detailed description of the grain handling and transportation industries. In the final section, highlights of the recent Royal Commission on Grain Handling and Transportation are discussed.

A. Overview

There are a number of unique attributes which override the grain marketing system in Australia and have important impacts on the quality of grain exported. First, each state has a single Bulk Handling Authority (BHA) which acts as the authorized receiver on behalf of the AWB. These BHA's are charged with the responsibility of storage, and country and port elevation. Second, though conceptually possible there is limited trade or transportation between states. This is primarily due to tradition, geography, and logistical constraints. As a result in general wheat produced in each state is destined to be handled by the state BHA and marketed by the AWB. Third, there is very limited on-farm storage. The primary reason for this is that given the operation of the Guaranteed Minimum Price (GMP) which does not (in general) differentiate by month of delivery, there is a financial disincentive for deferred delivery.[10] As a result a very large proportion of the wheat is delivered to the BHA's at harvest, or within several weeks of harvest. The BHA's therefore have constructed extensive handling capacity to meet the harvest peak demands. Also, extensive storage capacity has been developed throughout the handling system compared to other exporters. Given that for the most part storage is provided by handlers allegedly more experienced and knowledgeable about grain storage, the wheat is less likely to deteriorate or be subjecgted to infestation.[11]

The wheat marketing system in Australia is described as in Figure 4.1. The marketing system is very simple and comprised of typically harvest sales by growers to the AWB, storage within the handling system, and delivery by the BHA on behalf of the AWB to the customer. Of particular importance here is the role of the AWB. There are a number of implications of the fact that the AWB takes ownership at the point of first sale, and retains it throughout. First, the AWB has tremendous control over quality evaluations, preservation and enhancement, which is exercised through the state BHA's. This applies specifically in the case of infestation, but also applies to other parameters of quality (e.g., segregation, cleanliness, etc.) An important fundamental characteristic of wheat marketing which underlies the system is that of applying stringent quality requirements at the point of first sale. This generally precludes problems downstream in the marketing system. Second, being there are basically only two financial transactions in

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[10] However, as discussed in Section III, there have been attempts to encourage deferred delivery.

[11] Extensive analyses have been conducted by the NSW Department of Agriculture on on-farm versus off-farm storage and the implications of infertation. See Johnston for discussion.

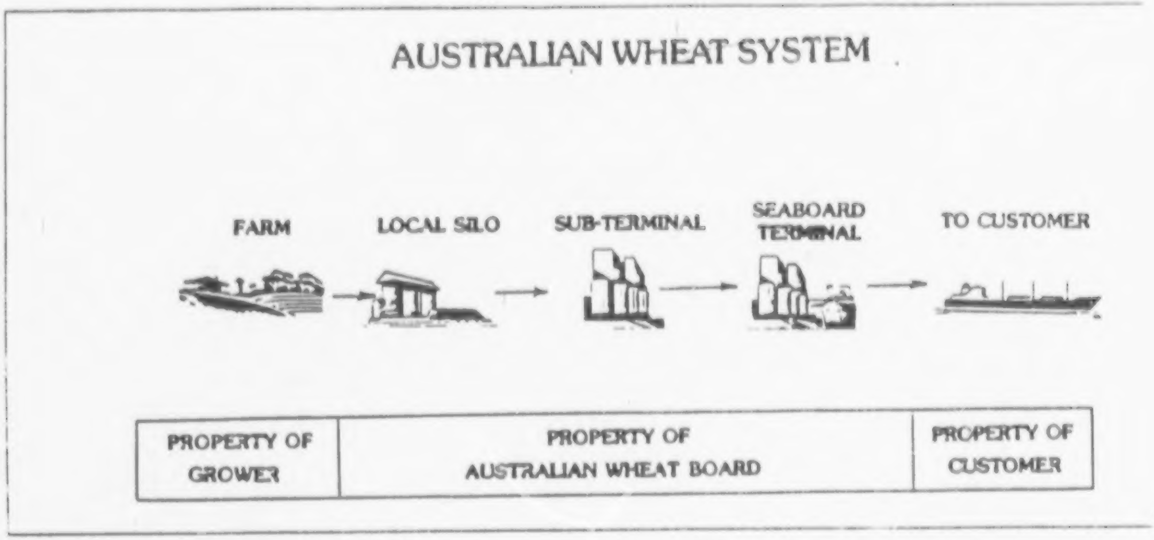
AUSTRALIAN WHEAT SYSTEM
FARM
LOCAL SILO
SUB-TERMINAL
SEABOARD TERMINAL
TO CUSTOMER
PROPERTY OF GROWER
PROPERTY OF AUSTRALIAN WHEAT BOARD
PROPERTY OF CUSTOMER

Figure 4.1. Australian Wheat Marketing System.

marketing sytem, each of which requires sampling and inspection. There is limited (or nil) incentive for blending to meet specifications or limits.[12]

B. Bulk Handling Authorities (BHA's)

Organizational Structure. In each state a monopoly exists which is authorized to handle wheat on behalf of the AWB. In general these are state-owned monopolies or farmer-owned cooperatives but the statutory or organizational structure may vary across states. Table 4.1 shows the authorized handlers in each state.

The BHA's are in general charged with the responsibility of receival, handling, and storage. In these activities, they are responsible for sampling and inspection and application of receival standards at the country elevator, as well as preserving the quality while in the marketing system. An extensive storage and handling agreement exists between each individual BHA and the AWB. This agreement provides detail regarding services provided and remuneration. The clauses specifically related to "Care of Wheat" are as follows (Royal Commission into Grain Handling and Transport, Institutional Arrangements, pp. 36-37).

> Care of wheat - the bulk handler is required to "take all proper and reasonable precautions and do all things necessary to preserve and safeguard the wheat...against contamination, damage, destruction, deterioration, infestation, loss, theft, and unauthorized admixture" (clause 12.1). Where a problem arises the bulk handler must inform the AWB and "at their own cost take all reasonable steps to minimize the loss to the Board [clause 12.2 (d)].

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[12] In contrast the U.S. marketing system is characterized by a number of financial transactions within the marketing system. Each requires a contract specification and generally incentives exist to blend to the limits of a contract.

> The agreement also provides for penalties to be imposed on the bulk handler in such cases. In the case of defective outturn (excluding insects) the penalty is set at whatever the AWB had to compensate the buyer up to a maximum of 10 percent of the value of the shipment (GMP x shipment tonnage). For example, if 4000 tonnes out of a shipment of 20,000 tonnes was refused by a buyer for admixture reasons and the AWB had to compensate the buyer for the bad parcel (4000 tonnes x GMP) the bulk handler would only pay the AWB an amount equal to 2000 tonnes x GMP.
>
> Where defective out-turn is caused by insect infestation the compensation payable by the bulk handler can vary from nothing to 80 percent of the amount payable for other types of defective outturn (see above). The level of compensation depends on the seriousness of the infestation and varies in accordance with a formula based on rejection rates. Hence, in this case the bulk handler will incur a penalty from the AWB which does not meet the penalty imposed upon the AWB by the buyer.
>
> In the case of excessive shipping outturn (that is, loading more than they should) the bulk handler is permitted a 5 percent error margin. If it loads an amount in excess of this margin and the AWB does not receive payment from the buyer for this extra amount then the bulk handler must pay the AWB an amount equal to the GMP value of the excess. For example, if the bulk handler loads 54,000 tonnes instead of the required 50,000 tonnes the error margin on 50,000 tonnesis 2500 tonnes and so the bulk handler would pay the AWB an amount equal to (4,000 - 2,500) x GMP.
>
> Penalties for defective or excessive outturn contained in the agreement relate to only to export shipments.

A responsibility of the BHA is to preserve the condition of the wheat, and if problems arise penalties may be applied. Thus, an important activity, and cost, of the BHA's is related to conditioning as discussed below.

In general each BHA operates a centralized system and logistics are closely coordinated with the AWB. The system is centralized in the sense that laboratories and quality evaluation as well as logistical planning is closely coordinated with the AWB.

TABLE 4.1. AUTHORIZED HANDLERS OF WHEAT IN EACH STATE

State	Organization
Queensland	State Wheat Board
New South Wales	Grain Handling Authority
Victoria	Grain Elevator Board
South Australia	South Australian Cooperative Bulk Handling Board Ltd.
Western Australia	Cooperative Bulk Handling Ltd.

SOURCE: Australian Wheat Board, _Wheat Industry Guide_.

Pricing of Handling and Storage Services. Prices for handling and storage of wheat are essentially determined by the cost structure of the state BHA's. Formally, the Grain Storage and Handling Agreement is the document which specifies the price charged for these services. On an annual basis the BHA for each state assesses its costs and anticipated output and determines a price for handling and storage. Presumably, the AWB doesn't or cannot, negotiate these fees and strictly relies on cost evidence of the BHA (Royal Commission, no. 2, p. 36).

The agreement allows for differential pricing of services to growers but in practices there have only been a few attempts to do so (Spriggs et al., p. 11). The BHA's usually pool their costs and charge an equal rate to each grower. As a result there is limited incentive for participants to necessarily choose the most efficient services (e.g., delivery location, time) and likely has resulted in excessive handling and storage throughout the system. Indeed, cost pooling is a principal issue in the Royal Commission and a potential solution to rationalization of the system.

The various components of handling and storage costs for 1986-87 are shown in Table 4.2. Besides "Handling and Storage" there are a number of other costs which are deducted in determination of producer prices. Of interest here is the cost of handling and storage which varies for \$12.44/MT in South Australia to \$17/MT in Queensland.[13] The costs of handling and transport have increased substantially through time (Table 4.3). These costs increased by 51 percent in nominal terms between 1979/80 and 1985/86.

The issue of handling and storage costs are critical to the Royal Commission. In fact at least part of the impetus for the Royal Commission was

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[13] For comparison on this coverts to 23.7 to 32.4¢/bushel U.S.

TABLE 4.2. HANDLING, TRANSPORT, AND OTHER DEDUCTIONS, 1986/87

	New South Wales	Victoria	South Australia	Western Australia	Queensland
	($/Tonne)				
Handling and storage	16.70	14.63	12.44	13.05	17.00
Freight	24.44	21.71	6.69	14.37	15.70
Wharfage	1.76	0.88	1.05	0.50	1.40
Carryover	0.82	0.85	1.27	1.50	0.61
Two port loading	--	0.47	1.11	0.30	--
Other levies	0.50	0.50	1.59	2.34	2.00
TOTAL	44.24	39.04	24.15	32.06	37.61

SOURCE: Australian Wheat Board Annual Report, Various Issues.

TABLE 4.3. PRINCIPAL GROWERS' DEDUCTIONS FOR HANDLING, STORAGE, AND FREIGHT[3]

Year	Handling and Storage							Freight[2]							Total						
	NSW[1]	VIC.[1]	SA	WA	Qld	Tas	Australia	NSW[1]	VIC.[1]	SA	WA	Qld	Tas	Australia	NSW[1]	VIC.[1]	SA	WA	Qld	Tas	Australia
1979-80	12.00	7.00	7.00	11.90	10.50	10.24	9.96	15.71	12.38	5.09	9.23	11.98	--	11.67	27.71	19.38	12.09	21.13	22.48	10.24	21.63
1980-81	12.00	8.00	10.00	12.63	16.00	11.23	10.92	15.86	14.08	5.62	9.31	11.90	--	11.62	27.86	22.08	15.62	21.94	27.90	11.23	22.54
1981-82	14.40	10.35	11.35	11.67	16.00	12.44	12.73	19.38	16.21	6.27	12.18	12.87	--	14.80	33.78	26.56	17.62	23.85	28.87	12.44	27.53
1982-83	14.90	12.00	11.95	12.00	16.50	13.07	12.77	19.94	17.21	5.02	13.51	13.08	--	13.83	34.84	29.21	16.97	25.51	29.58	13.07	26.60
1983-84	16.50	12.95	12.43	13.42	21.00	14.58	14.73	22.05	19.98	6.87	14.32	14.87	--	17.56	38.55	32.93	19.30	26.75	35.87	14.58	32.29
1984-85	17.20	13.75	12.74	13.05	20.00	15.00	15.29	23.63	20.09	6.50	14.79	16.20	--	17.39	40.83	33.84	19.24	27.84	36.20	15.00	32.68
1985-86	16.70	13.80	11.93	13.05	19.00	16.00	15.08	24.50	20.76	7.08	13.56	15.70	--	17.88	41.20	34.56	19.01	26.61	34.70	16.00	32.96

[1] The principal deductions shown for NSW and Victoria are the standard charge deducted from growers at receival sites. In both states, growers are offered discounts to encourage deliveries at a particular site or during a specified period.
[2] Freight figures shown for each state have been calculated by dividing the total dollar amount deducted.
[3] Calculated for indicative purposes only.

SOURCE: Australian Wheat Board, Annual Report, Various Issues.

the apparent high costs of handling and transportation in Australia. Several submissions to the Royal Commission (e.g., AGEA, Spriggs et al.) have attempted to make comparisons to other exporters. Any international comparisons are questionnable for a number of reasons, particularly because the handling and storage systems serve different purposes in different countries. In the case of Australia more extensive storage is required and the cost of conditioning (e.g., infestation) would exceed that of other exporting countries. Nevertheless, the submissions have raised the issue that the costs of handling and storage in Australia exceeds those in exporting countries, and that the rate of increase in handling and storage costs have exceeded those of other exporters. Spriggs et al. shows that these costs increased 11 percent in real terms in Australia in the past 10 years, compared to a 7 percent decrease in Canada. Whether these cost levels are due to the lack of competition, or the peculiar handling tasks in Australia is central to the Royal Commission. The point is that it appears the marketing system has been unresponsive to market fundamentals and international competition.

C. Transportation

Grain is delivered from the farmer by truck to country receiving points, subterminals or central receiving points, and in some cases directly to export terminals. Each State and BHA has established a grain flow to their export terminals. In some cases, grain is moved by rail from the country receiving point to a subterminal, unloaded and stored, and reloaded into railcars for shipment to the port. In other cases, grain is loaded into railcars at the country receiving point and railcars from several points are sent to a central point for shipment as a unit to the port. Each State regulates transportation modes between country and export points within it.

In New South Wales, transportaion has been deregulated. However, until Port Kembla comes online, the existing port terminals do not have the capability to unload trucks so all grain is moved by rail. Transportation modes are regulated more in Victoria and the rail line must be used to transport grain more than 60 kilometers. In Queensland, grain movement from country to export location is regulated and grain is only moved by rail. South Australia does not have its own railroad so grain moves by truck to port locations or on the Australian National Railway. Western Australia regulates the amount of grain moving by rail from country to export locations. This rail system serves approximately 70 percent of the State with the remaining 30 percent serviced by truck. This State has a peculiar situation in that both narrow and standard gauge tracks exist. Several port locations are equipped to receive grain on both gauges while others are dedicated to only one. In areas serviced by rail, grain can be hauled to the port in only farmer own trucks.

Some grain moves across State lines by truck and rail. However, in some cases rail movements between states is hindered by the fact that both narrow and standard gauge tracks exist between some States and in the case of Western Australia within the state. The condition of the track and equipment used to move railcars limits the number of railcars that can be moved at one time. In Victoria for example, a maximum of 39 railcars can be moved as a unit to the port.

D. Storage Types, Capacities, and Design

The Royal Commission has reported that at least 75 percent of the wheat harvested is handled by BHA's. The rest is handled by private firms or remains on-farm. Each BHA owns and operates country receiving points, subterminals or central receiving points, and export facilities. These facilities consist of vertical concrete or metal silos, flat (horizontal) warehouses, and bunkers. At any one particular facility there may be a combination of any of these storage types. These facilities are linked together to one or more export facilities within the State by road and rail.

The type of capacities of storage, vertical, horizontal, and/or bunker, varies by State. Tables 4.4 and 4.5 depict storage capacities, by State, for vertical, horizontal, and bunker. A review of these figures shows that several States have significant amounts of storage at their port locations. Port storage ranges from approximately 7 percent of total storage in Queensland to 50 percent in South Australia. It is interesting to note the differences in storage types. For example, in Western Australia the bulk of their storage is in horizontal storage while in South Australia vertical storage predominates. This fact produces distinctly different handling and storage problems for each BHA and has resulted in differing strategies for similar problems, i.e., fumigation practices.

Total storage capacities, by State, as compared to production is outlined in Figure 4.2. According to the Royal Commission, total storage, which includes vertical, horizontal, and bunker, exceeds grain production for a five-year production average to 1985-86 and the record year of 1983-84.

On-farm storage has been increasing. Table 4.6 outlines the on-farm capacities as of 1984-85. These figures represent wheat, barley, oats, and sorghum, and provide an indication of the extent of on-farm storage. On-farm storage in Western Australia is regulated in that only sealed, metal upright silos can be installed. These silos are usually 5 mt capacities that can be pressure tested prior to fumigation.

There is a move to require that all on-farm silos be painted white. Those interviewed believe this helps deflect heat build up and reduces the

TABLE 4.4. TOTAL STORAGE CAPACITY[1]

State	Country Storages	Seaboard Storages	Total
	----------------	000 MT ----------------	
New South Wales	5,887	309	6,196
Victoria	3,027	991	4,018
South Australia	2,379	1,976	4,355
Western Australia	4,724	2,064	6,788
Queensland	1,586	266	1,852
Tasmania	11	20	31
Australia	17,614	5,626	23,240

SOURCE: Australian Wheat Board.

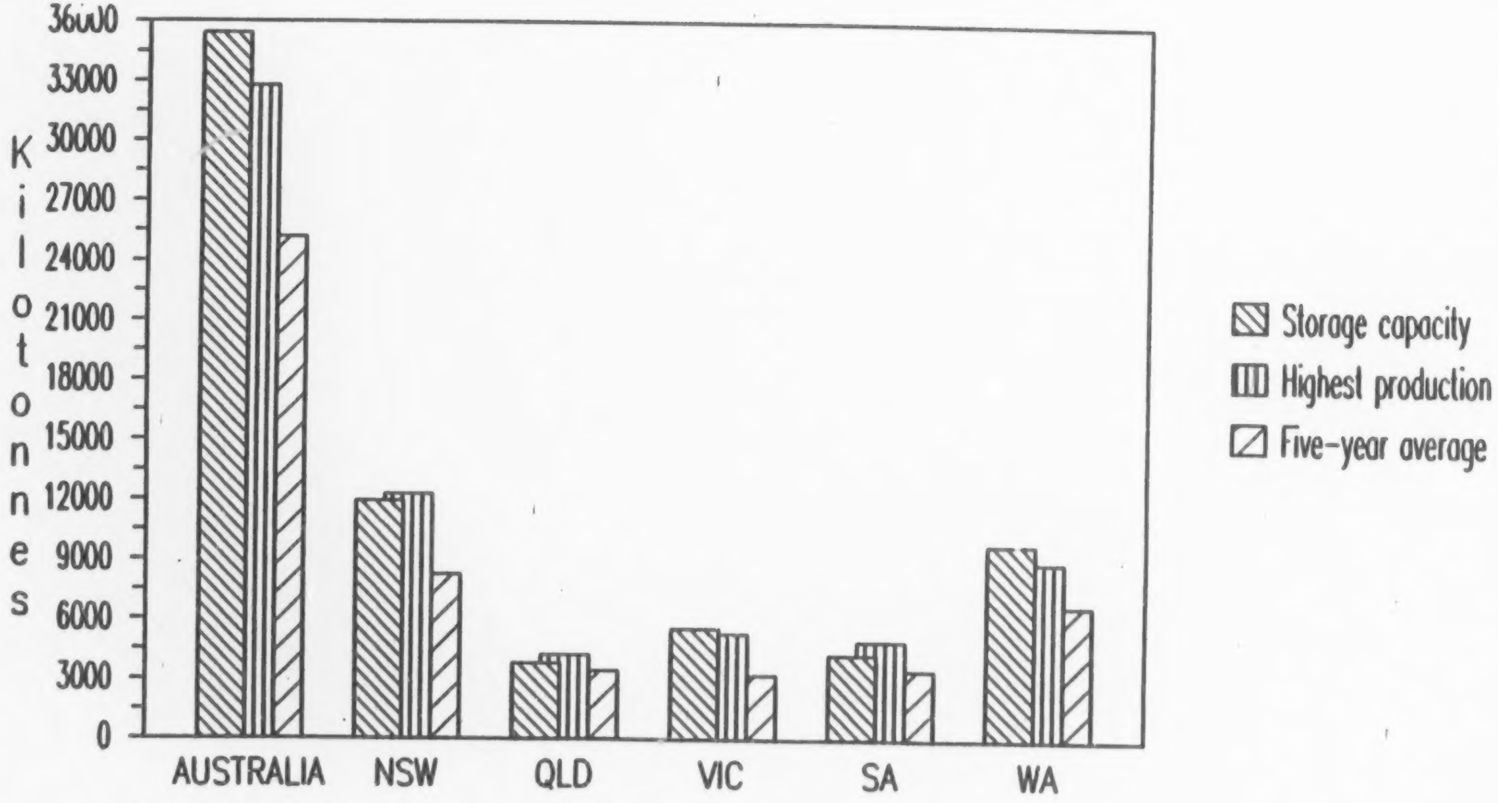
[1] At September 30, 1986; excludes bunker and open bulkhead stores.

TABLE 4.5. COUNTRY AND PORT STORAGE PROFILE (kt)

	Vertical	Horizontal	Bunker	Total
QUEENSLAND				
Port	265	--	--	265
Country	895	629	2020	3544
Total	1160	629	2020	3809
NEW SOUTH WALES				
Port	297	--	--	297
Country	2007	3799	5848	11654
Total	2307	3799	5848	11951
VICTORIA				
Port	290	720	--	1010
Country	1983	922	1652	4557
Total	2273	1642	1652	5567
SOUTH AUSTRALIA				
Port	1581	320	478	2379
Country	1915	464	--	2379
Total	3496	784	478	4758
WESTERN AUSTRALIA				
Port	587	1123	106	1816
Country	242	5296	2458	7996
Total	829	6419	2564	9812
AUSTRALIA (TOTAL)				
Port	3020	2163	584	5767
Country	7042	11110	11978	30130
Total	10062	13273	12562	35897

SOURCE: SACBH, 1986; GHA, 1986; GEB pers. comm; CBHAW pers. comm; BGQ submission.

Figure 4.2. Grain Storage and Production



Sources: BAE 1986, BHA submissions.

TABLE 4.6. ON-FARM STORAGE CAPACITY, 1984-85

	New South Wales	Victoria	Queensland	Western Aust.	South Aust.	Australia
Average tonnes per farm	292	167	251	186	81	209
No. of farms	15,886	8,556	5,750	8,157	7,739	46,088
Estimated total on-farm storage (mt)	4.64	1.43	1.44	1.52	0.63	9.66
Storage capacity as a percentage of harvested winter cereal and sorghum production	59	37	46	17	17	35
Increase in storage capacity since 1978-79 (percent)	24	56	97	39	64	40

SOURCE: Howard and Lawrence (1986).

incidence of infestation. In Victoria and New South Wales, these types of on-farm silos are being installed even though there is no regulation covering the types that can be installed.

Port storage capacities and maximum load out rates are outlined in Table 4.7. The port locations by State are as follows:

Queensland:	Mackay, Gladstone, and Brisbane (Brisbane has three elevators; Fisherman Island and Pinkenba 1 and 2)
New South Wales:	Newcastle and Sydney (Port Kembla is scheduled to open in 1989 and Sydney will be closed)
Victoria:	Geelong and Portland
South Australia:	Adelaide, Ardrossan, Wallaroo, Port Pirie, Port Giles, Port Lincoln, and Thevenard
Western Australia:	Esperance, Albany, Kwinana, and Geraldton

A review of this table indicates that not all of the ports can accommodate a "Panamax" type vessel [60,000 deadweight tonnes (dwt.)] Twelve ports can handle these vessels but only six can fully load the required tonnage because of limited draft in the port. At these six ports, "Panamax" type vessels must be "topped off" at another port. The load out rates reported in the table are maximum rates that are rarely achieved on a continuing basis. Vessel loading does not take place around the clock. Extended and/or double shifts are used predominately at port locations.

The mixture of storage and handling facilities is linked to increased production. Initially several upright concrete silos with one leg, one unloading pit for trucks using belts feeding the leg, and a rail and sometimes truck load out capabilities were constructed. This configuration is similar to country elevators in the United States. In Victoria and New South Wales these country receiving points were positioned along rail lines at

TABLE 4.7. PORT CAPACITIES AND MAXIMUM OUTLOAD RATES

Port	Ship Capacity[a] Partly Loaded	Ship Capacity[a] Fully Loaded	Maximum Outload Rate
	(dwt)		(tph)
Pinkenba No. 1	50,000	35,000	1,200
Pinkenba No. 2	50,000	35,000	1,000
Fisherman Islands	60,000	60,000	2,400
Mackay	35,000	35,000	300
Gladstone	50,000	50,000	1,600
Newcastle	60,000	60,000	3,400
Sydney	60,000	60,000	2,000
Port Kembla	120,000	120,000	5,000
Geelong	60,000	55,000	1,000
Portland	60,000	55,000	1,000
Port Adelaide	40,000	40,000	800
Ardrossan	45,000	30,000	800
Port Giles	60,000	45,000	3,000
Wallaroo	60,000	35,000	3,500
Port Pirie	40,000	40,000	1,750
Port Lincoln	80,000	80,000	3,600
Thevenard	30,000	15,000	350
Albany	60,000	50,000	1,000
Geraldton	60,000	20,000	800
Esperance	45,000	30,000	600
Kwinana	80,000	70,000	5,000

[a] Rounded to nearest 5,000 dwt.

SOURCE: Hetherington Wesfarmers Shipping Agency (1987).

approximately 5 kilometer intervals. As production increased, large flat warehouses were integrated into these facilities.

Warehouses are fed from an inbound leg to an overhead belt in the warehouse. At the warehouses visited, several channels with augers in the floor ran the length of the warehouse. Aeration ducts installed on the floors running across the width had also been installed. Unloading takes place by the augers in the channels feeding belts that in turn feed a leg. In some locations, incline belts had been installed to connect the warehouse with existing structures. Front-end loaders are used to push the grain pile into the channels on the floor.

As production increased further, bunker type storage was introduced. These plactic covered bunkers provide large volume storage at reasonable cost. A bunker consists of three retaining walls which are lined with a plastic sheet, filled with grain, and then covered with plastic. They are aligned so that the length runs north to south. This prevents one side of the cover from deteriorating faster. The bunkers are filled by unloading trucks at the bunker opening and augering the grain into a pile. Special augering equipment with directional chutes has been designed to aid in this process. This procedure produces a very smooth grain surface that can then be covered with polyethylene film, or woven and coated PVC fabrics. These covers are water tight, resistant to puncturing, and sealable since bunkers are fumigated on a regular basis. Unloading takes place by progressively rolling back the cover to expose a portion of the pile. Front-end loaders and augers are used to load grain into trucks that are then driven and unloaded at the elevator for loading into railcars. This procedure allows the bunker to be resealed since an entire bunker is not usually unloaded at one time.

As more storage and handling capabilities were required at subterminals and central receiving points, 5,000 to 10,000 mt sealed upright metal silos fitted with recirculation for fumigation where integrated into the system. At the same time, incline belts were installed in some locations to replace existing legs or provide additional elevation capacity. In addition, multiple truck unloading pits were also being installed.

A major project was also undertaken to seal and retrofit existing upright concrete silos with recirculation for fumigation. The new export facility being built at Port Kembla in New South Wales consists of sealed metal silos filled with recirculation for fumigation and incline belts. These improvements to the system provide BHA's with the capability to dedicate truck unloading by grade (each unloading pit is designated a grade) and carry out effective fumigation in silos and bunkers.

E. General Handling Practices

BHAs are required to store grades separately. In addition, grain designated for special customers is also kept separate. Accomplishing this task is difficult in some States based on the type of storage and handling facilities available. In Victoria, five segregations must be maintained, in Queensland seven, and in South Australia four. These segregations are based on grade and do not include segregation by customer nor the effects that weather damage may have on a crop in any particular year.

The design of storage systems using large upright concrete and metal silos, large flat warehouses, and large bunkers makes it difficult to segregate these qualities and still provide flexibility for loading out specific qualities. In upright silos, facilities often have limited number of bins each having very large capacities. The flat warehouses and bunkers are large enough for several segregations to be made. However, loading out specific qualities from this type of facility is difficult since the grain must be unloaded from one end. This means if the quality desired is not at the unloading end then the grain desired cannot be loaded out. To compensate for this, some BHAs are considering designating certain facilities for receiving specific qualities.

The size and limited number of bins available, plus the size of the flat warehouses and bunkers, makes segregating differing qualities difficult. Fortunately for the BHAs, the quality as determined by grade, i.e., Prime Hard, Hard, and Australian Soft White (ASW) is mostly confined to certain growing areas. For example, wheat grown in northern New South Wales is predominately of the Prime Hard and Hard grades, whereas in the southern portion of this State ASW is the predominate grade. In the case of ASW, differing qualities within the grade are kept separate, but in most cases are commingled.

Unless commingling of different qualities takes place on grain received from the farmer, i.e., ASW commingled in the same bin with General Purpose, blending of differing qualities at the country and subterminal level for shipment to a port is difficult. Facility design at the subterminal facilities visited is such that grain can be drawn from multiple bins for loading into railcars. However, blending grain from flat warehouses and bunkers with grain being drawn from bins would be nearly impossible. In the case of the export facilities visited, Port of Sydney and Geelong, blending of differing qualities can and is done to some degree.

These port facilities contain a number of smaller bins and are basically of a design similar to the older export facilities in the United States. The one main difference is that each facility is divided in distinctly separate sections based on the number of load out spouts. Both facilities have four separate delivery systems that are fed from four separate sets of bins. Grain from each delivery system is loaded into a separate hold of the vessel.

In the case of Port Sydney, there is no way for one delivery system to cross over to another so blending can only take place within each system. There is a section in both facilities that can be used for holding out-of-condition grain and then reconditioning it to move it to another part of the facility for shipment. At Geelong each delivery system feeds into 18 small shipping bins. These shipping bins are, to a limited degree, dedicated to a particular delivery system but can be directed across systems at this point. Facility managers at both locations indicated that they do blend on a continuing basis. However, blending is limited to a very few factors drawn from only a couple of bins and is not undertaken to the degree that it is in the United States.

The design of these facilities and the procedure of dedicating bins and delivery systems to particular load out spouts creates a unique problem for facility managers. In order to assure efficient loading, exact qualities for each shipment in sufficient quantities must be located in each part of the facility or the loading spouts for that system cannot be used. If one or more of the delivery systems cannot be used, the vessel has to be shifted at berth several times in order to complete loading. This is time consuming and very costly.

Managers made a point to show the team their bin boards and that equal quantities were stored in each system. What this does, in fact, is reduce the number of bins available for binning different qualities by four. The manager of the new Port Kembla facility indicated that once that facility opens, a change in attitudes regarding receipt of out-of-condition grain must be made since this facility does not have small bins for segregating and reconditioning the grain.

The overall design of the BHAs country and subterminal facilities in New South Wales and Victoria provide an excellent source for blending once particular facilities are dedicated to receive specific qualities. Origination of rail shipments from the country could be made so that differing qualities in the correct proportions arrive at the port and are commingled or set aside in the appropriate locations within the facility for delivery to the vessel.

Grain cleaners and grain dryers are not maintained at BHA facilities. If the grain received is out of specification, the grain is rejected. Commercial grain cleaning is available and must be used before acceptance by the BHA. The export elevators and subterminals visited by the team all had dust removal equipment. Dust is not reintroduced into the grain stream, it is collected and trucked to land fill sites. Each facility had installed equipment for applying grain protectants to the grain at the time of receiving. In the facilities visited, this equipment was located on the inbound belts running from the unloading pit to the inbound leg.

Facility cleanliness is a major concern as well as maintaining grain free of infestation. Empty storage space is swept out and sprayed with a insecticide prior to receiving grain. Dust accumulation and grain spills are cleaned on a continuing basis since the Department of Primary Industry (DOPI) inspects each facility yearly and conducts random unannounced inspections throughout the year. During these inspections DOPI reviews the physical structures as well as the records kept by each facility on their cleaning program. Every month grain in storage is inspected for the presence of infestation. In facilities where bins can be turned, a portion of the bin is unloaded (cored), sampled for the presence of insects, re-elevated, and placed into the same bin. In flat warehouses and bunkers, the grain is probe sampled. If the grain is infested it must be fumigated. In addition to general day-to-day housekeeping, every two months residual insecticide is applied to all handling equipment.

F. Royal Commission into Grain Storage, Handling, and Transportation

A commission was established in light of the current problems in the grain handling and transport system in Australia. The impetus for the Royal Commission was due to concerns regarding the efficiency and cost effectiveness of the existing grain distribution network. This is the first comprehensive examination into the grain handling and transport system in Australia in many (at least 50) years, despite 5-year reviews of the AWB by the Industries Assistance Commission (IAC). The general approach of the Royal Commission has been to conduct their own analysis, and to receive submission on various topics by interested parties. However, an important point is that the scope of the Royal Commission does not include marketing which is concurrently being addressed by the IAC. There are numerous issues being addressed by the Royal Commission ranging from land transport, to work practices to ownership of the grain handling system. Only selected issues related tangentially to the issues of quality are discussed below. A comprehensive discussion of the issues is contained in various working and discussion papers of the Royal Commission. In addition, the Royal Commission is expected to present its findings and recommendations in early 1988.

There are three issues generally related to the handling and storage industry. These include the increase use of on-farm storage (including private storage), grain insect control, the cost of storage, and handling and segregation. Underlying these issues are various perceptions related to grain quality and insect control. First, the AWB places significant emphasis on cleanliness and hygiene standards (hygiene standards refers to both cleanlines and the insect control program) in marketing, which may be jeopardized in a more commercial environment. There is a common belief that increased use of on-farm storage would result in increased infestation and/or residue. Also, deregulation of the markting system would add difficulties in controlling insects. Second, a perception exists that a monopoly handler, who doesn't take ownership of the grain, is necessary to administer the hygiene standards traditionally practiced in Australia. Private handlers would have less incentive to exercise control and private traders would also have incentives in blend to factor limits.[14] A third perception is that segregation of wheat into many categories assists the AWB in marketing efforts. Indeed recent efforts may result in increased segregations. This has the potential effect of requiring more extensive storage facilities, and likely underutilization throughout the system.

There is much sympathy to the notion that current hygiene standards are appropriate in Australia. Thus, a mjaor problem for the Royal Commission is how to get the benefits of increased competition (i.e., lower handling costs) without jeopardizing grain quality. Extensive modelling was conducted to analyze the impacts of alternative competitive environments. Results indicated that elimination of the state monopoly BHAs and transport as well as pooling of port service costs would lower the average cost of distribution from $58/MT to $50/MT, or a 10 percent decrease. An issue haunting the Royal Commission however, is whether sufficient competition would exist to realize these savings. Overriding evaluation of the alternatives is that increased competition or increased use of farm storage would result in a deterioration in the quality of wheat. In recognition of these savings and potential costs of increased infestation and pesticide residues the Roayl Commission made several points (discussion paper no. 5, p. 51). In general, the Royal Commission had indicated that alternatives exist for administering current hygiene standards and the costs of doing so likely are less than the benefits of increased competition (discussion paper no. 5, p. 72).

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[14] Private traders contend that by not blending to limits, the AWB is in fact "giving away" a quality factor and not receiving a premium. On the other hand the AWB contends it sometimes intentionally ships more of a preferred quality attribute for purposes of reputation.

V. Variety Development and Release

The purpose of this section is to discuss the development and release of wheat varieties in Australia. In the first sub-section a brief overview of the industry is provided and subsequent sub-sections explain the role of the Australian Wheat Board (AWB) and the procedures for release.

A. Overview.

Wheat is planted in Australia during their winter (May-July), grows during the spring months, and harvest commenses from September/October to January. The varieties are spring type, in the North American sense, but are planted during the winter. All of the wheat is white, and any red varieties would be classed as feed. All varieties have to meet certain milling criteria and there is no active program to develop feed varieties. The GP and Feed grades are simply milling varieties typically with excessive weather damage.

The plant breeding industry is predominately public. Each state's Department of Agriculture includes public expenditures on breeding. Producers pay a checkoff (40¢/MT) which is matched by the Commonwealth and distributed on the competitive basis. Cargill is of the few (or the only) private breeders and recently released a hybrid which has gained 30 percent of the sales in NSW. Producers typically buy a new variety when released and use it for many years before replacing it with a newer variety.

B. Role of the AWB

The AWB has two important roles to play in the development, release and production of varieties. First, it administers a Variety Control Scheme (VSC) which was discussed in detail in Section III and is complementary to the activities of variety release. The VCS is used for classification and segregation at the country elevator level. In addition, through the VCS and explicit premiums for APH and AH, or discounts for ASW, the AWB essentially provides the incentives/disincentives for production of certain varieties in particular locations (silo groups). It is through the incentive/disincentive mechanism of the VCS that it is complementary to the release procedures discussed below. Producers are not regulated in marketing varieties they produce, nor are breeders formally regulated in the release of varieties: but if a variety is not prescribed it may be subjected to discount from ASW, or being classified as Feed which entails a substantial discount.

The second role of the AWB is that it is a voting member on the quality evaluation committee in the release process of each state. This is a very important committee which conducts quality tests on advanced lines. To give guidance to wheat breeders or quality the AWB provided a broad set of guidelines in 1976. These are general guidelines regarding quality but each variety must stand on its own in the review process. In 1987 the AWB has proposed minor revisions in the guidelines. These are shown in Table 5.1 The underlying idea is that all varieties conform to certain physical criteria as reflected in the receival standards. These guidelines relate to milling criteria for each grade and are intended to provide uniformity with respect to end-use criteria. The guidelines are designed to reflect the values that customers feel are appropriate for each grade given price differentials and minimum end-use requirements. There are slight changes in the guidelines being proposed for 1987, generally reflecting increased uniformity. Further, minor requirements were also proposed with respect to measurement standards. These guidelines are implemented by the AWB (presumably) in its role on the quality committee discussed below.

TABLE 5.1. QUALITY GUIDELINES FOR WHEAT BREEDERS, 1976, AND PROPOSED FOR 1987

	Protein[1]	Hardness	Extensogram		Viscograph
			Height	Extensibility	
	%	PSI	BU	CM	BU
1976 Guidelines					
Soft	less than 10	Over 22	200 ± 50	Over 17	--
ASW	9.5-12.0	16-24	350 ± 50	Over 18	--
AH	11.5-13.0+	10-17	450 ± 50	Over 20	--
APH	12.5+	10-14	550 ± 50	Over 22	--
1987 Guidelines					
Soft	Below 9.5	Over 22	200 ± 50	Over 17	480+
ASW					
Soft grained	9.5-11.0	20-24	350 ± 50	Over 18	450+
Hard grained	10.0-11.5	16-20	350 ± 50	Over 19	450+
AH	11.5-13.0+	14-17	450 ± 50	Over 20	450+
APH	13.0+	14-16	550 ± 50	Over 22	450+

SOURCE: Australian Wheat Board.

[1] 1987 Proposal to measure protein on 11 percent moisture basis.

C. Procedures for Release

Release of varieties ultimately is the discretion of each individual state. While each state may have a slightly different committee structure, the general procedures are similar. The procedures and committee structure for New South Wales (NSW) are described below.[15] Conformity with the review process is essential for endorsement of a variety by the committee and AWB.

In NSW there are three committees involved in the variety release decision. These include the Uniform Quality Testing (UQT), State Wheat Improvement Committee (SWIC), and the Standing Advisory Committee on Wheat (SACW). The UQT and SWIC make recommendations to the SACW, which makes recommendations to the State Minister of Agriculture whom ultimately gives the final approval for lines to be released.

The UQT is a quality evaluation committee. Voting members include the AWB, end-users, the Bread Research Institute (BRI), and State Agriculture Department Laboratories. In addition, observers may attend meetings. Extensive analyses of end use performance is conducted at multiple laboratories on advanced lines which have been submitted. Tests include (but are not limited to): test weight, particle size index, flour yield, grain protein, falling number, color, loaf score and volume, and measures from the farinograph, extensograph, resistograph, and visograph. These tests are compared to control varieties which vary with respect to the criterion. Table 5.2 shows the control varieties used in NSW which differ from those in other states.

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[15] Formally, varieties don't have to go through the release procedure--it is only a gentleman's agreement for a breeder to submit a variety for review. In practice, in the past, all released varieties have been subjected to the review process described below.

TABLE 5.2. CONTROL VARIETIES BY GRADE AND PARAMETER FOR NEW SOUTH WALES

Parameter	APH	AH	ASW
Milling quality	Hartog	Kites	Kites
Grain size	Banks	Banks	Millewa
Extensibility	Hartog	Kites	Kites
Dough strength	Banks	Banks	Banks
Stability	Sunkota	Banks	Banks
Development time	Sunkota	Banks	Banks/Condor
Starch viscograph	Banks	Banks	Banks

SOURCE: Australia Wheat Board.

The SWIC evaluates the agronomic characteristics of submitted varieties. Tests included are primarily yield and disease resistence but also include other production related criteria. Though not specific, a variety is expected to have a yield greater than or equal to the variety it intends to replace.

The Standing Advisory Committee on Wheat receives data and recommendations from each of the UQT and SWIC committees. Members on this committee include representaives from the state farm associations, the registered seed growers association, and in the case of NSW, the Hard and Soft Wheat Growers Assocition and the Prime Wheat Association. Formally, this committee evaluates the information and makes a recommendation to the State Minister of Agriculture, who in turn makes the official decision on whether a variety is released (or prescribed). In evaluating the information the SACW is much more judgemental than other two committees. The criteria is not completely rigid and is somewhat responsive to the perceived needs of the market. For example, in recent years more emphasis has been placed on quality, particularly the protein level, in response to apparently declining levels of protein.

Given the recommendations of the SACW, the Minister of Agriculture in each state formally releases a variety. In particular, he prescribes a variety and if produced in a specified Silo group, would not be subject to varietal discounts by the AWB. However, if produced in nonspecified Silo Groups, it would be subjected to possible discounts. Thus, the State Minister of Agriculture has the capability of overriding the intents of varietal discounts applied by the AWB.[16]

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[16] In the recent IAC inquiry the AWB indicated that the release procedure of each state may preclude them from fully reflecting appropriate market values to producers. Discounts can be applied only if the variety is prescribed as such by the individual State Minister of Agriculture.

VI. Infestation Policies and Practices

A. Overview

In the early 1960s Australia was threatened with the loss of major wheat exporting markets due to high incidence of insect infestation in export shipments. The Australian wheat industry, in response to this situation, requested the government to enact legislation that would ensure continued access to these markets. As a result, export grain regulations were promulgated in 1963.

These regulations require that wheat, barley, oats, and sorghum be free from live infestation and otherwise fit for export. Originally only wheat was covered. Barley and oats were included in 1968 and sorghum was added in 1970. The inclusion of these grains resulted from the fact that they were being handled in the same facilities with wheat and cross-infestation was occurring.

The export grain regulations state that wheat being exported must be inspected as well as the vessels transporting the grain. The Department of Primary Industry (DOPI) is responsible for inspecting export terminals, other facilities that store grain destined for export, empty vessels used for transporting grain, and the grain being exported.

Currently the Export Control Act of 1982 provides the legislative basis for DOPI's inspection responsibilities. This Act took effect on January 1, 1983 and combined the inspection activities contained in the Customs Act of 1901, the Commerce (Trade Descriptions) Act of 1905, the Quarantine Act of 1905, and the Navigation Act of 1912.

B. Department of Primary Industry (DOPI)

The Export Control Act provides DOPI with inspection authority for a wide range of agricultural products. The Export Inspection Service (EIS) of

DOPI is the single entity responsible for inspecting meat, fish, dairy products, eggs, honey, grain, fresh and processed fruits and vegetables, and other horticultural and plant crops. In 1984 DOPI published regulations entitled "Grain, Plants, and Product Orders" to implement these programs.

EIS's primary role is to ensure exports meet acceptable quality and hygiene standards along with being correctly described in trade descriptions. Exporters are responsible for presenting commodities that meet the conditions and restrictions specified in the "Grain, Plants, and Product Orders." These requirements are applied to commodities for which phytosanitary and official certificates are required.

Authority for providing phytosanitary inspections for Australia under the International Plant Protection Convention (IPPC) has been delegated to EIS. This requires EIS to inspect and certify that "the plants or plant products described above (on the certificate) have been inspected according to appropriate procedures and are considered to be free from quarantine pests, and practically free from other injurious pests; and that they are considered to conform with the current phytosanitary regulations of the importing country." In order to carry out this responsibility, EIS has authorized individual State departments of agriculture to perform inspections on their behalf.

EIS interprets the terms "free from" and "practically free from" pests to mean nil. In other words, the tolerance for live insects and pests is zero. This interpretation is further expanded to include zero tolerances for rodent carcasses and excreta along with particular weed seeds and other pests that are subject to quarantine by importing countries.

The basis for EIS policies are outlined in a 1981 report by the Working Party on Infestation in Grain (Report of SCA Working Party on Infestation in Grain 1981). This group was set up by the Standing Committee on Agriculture to examine alternative pest control strategies and provide recommendations so that Australia could continue providing insect free grain. According to the report, 79 percent of Australian grain export shipments were accompanied by phytosanitary certificates in 1980.

The Working Party concluded that Australia should not issue phytosanitary certificates on grain that is known to contain live insects. This conclusion was based on the percent of shipments requiring phytosanitary certification and a statistical analysis of their sampling systems. This analysis determined that, even when no insects are found, a high probability exists that shipments actually contain insects. The Working Party felt that in order to comply with the terms "free from" and "practically free" as spelled out by the IPPC, a zero tolerance had to be maintained.

Specific sampling rates, detection, and rejection procedures have been established by EIS. Their sampling rate is 2.25 litres per 33.3 tonnes. Each sample is examined for live insects and when one live insect is found, the grain is rejected. The analysis of these rates and rejection levels are presented in the Working Party paper. For the purpose of this analysis, they assumed a random insect distribution in the grain being sampled. Based on this assumption, they concluded that their sampling rates would yield the following detection probabilities:

- 95 percent of 2,000 tonne bins containing 25 insects per tonne would be detected;
- 95 percent of 2,000 tonne bins containing 3 insects per tonne would not be detected;
- the chance of of detecting the only insect in a 2,000 tonne bin is 1 in 10,000.

They also examined the effect of increasing sample size and the current rejection levels. The results of these analyses follows:

Infestation Levels at Which One or More Insects Can Be Expected to be Found at Varying Sample Rates

Sample Size Kg/100 Tonnes	Infestation Level 90% Confidence	(Number Per Tonne) 95% Confidence
1.25	77 or more	100 or more
2.50	38 or more	50 or more
5.00	19 or more	25 or more (current)
10.00	10 or more	12 or more
20.00	5 or more	6 or more
40.00	2.5 or more	3 or more

Infestation Levels at Various Sample Sizes When no Insects Will be Detected

Sample Size Kg/100 Tonnes	Insects Per Tonne
1.25	2 to 100
2.50	1 to 50
5.00	0.5 to 25 (current)
10.00	0.25 to 12

95 Percent Confidence of Detecting One or More Insects With An Infestation Level of "n" Insects/Tonne

Number of Insects/Tonne	Sample Size Kg/100 Tonnes
0.1	1,500
0.5	30
1.0	15
5.0	3
10.0	1.5

Rejections After the Detection of One or More Insects Per 2000 Tonne Bin

Rejection Level	95 Percent Confidence Number of Insects/Tonne
No insects found	0.5 to 25 (this is the current system)
1 insect found	3 to 40
2 insects found	7 to 52.5

After reviewing these analyses, the Working Party recommended that the current sampling rate and rejection level be maintained. They felt that changing the sampling rate would be costly and that relaxing the zero tolerance would run counter to the IPPC requirements that signatory countries should control insects and pests in exported products.

C. Inspection Procedures

EIS carries out its enforcement and inspection responsibilities in four distinct areas: (1) registering facilities handling export grain; (2) inspecting facilities handling export grain; (3) inspecting grain in storage and as it is being loaded for export; and (4) inspecting vessels used to transport exported grain.

Registration of Handling Facilities. The purpose of the registration process is to ensure that an effective sanction, deregistration, exists when handling facilities continually fail to maintain the standards of cleanliness and hygiene required by law. All facilities with export volume exceeding 10,000 tonnes a year or where inspectors are present for more than 30 working days are required to be registered. Registration is optional for facilities that do not meet these requirements.

All registered and unregistered facilities that handle export grain are required to maintain their facilities in a clean condition which will prevent infestation or contamination. The main requirements for registration are that the facilities be designed, equipped, and operated hygienically; that a program of hygiene and pest control be developed; and records regarding cleaning and pest control measures be maintained. Failure to comply with these requirements, as evidenced by periodic inspections, is cause for deregistration.

Facility Inspections fall into three categories: (1) registration and re-registration inspections; (2) randomly inspecting registered facilities; and (3) randomly inspecting unregistered export facilities.

Registration and Re-registration Inspections are conducted on a yearly basis. The inspection entails a thorough examination of the facilities and surrounding areas for live insects and rodent infestation. The following areas are examples of areas inspected during this process:

- Bins and bin valves
- Conveyor belts
- Road and rail receipt hoppers along with the track areas at these locations
- Distributors and trippers
- Dust removal equipment, storage bins, and loadout areas
- Areas immediately surrounding the facility
- Shipping gallery and load out spouting

Records maintained by each facility regarding their hygiene and pest control programs are also examined. These records consist of the cleaning and pest control measures taken and must include sufficient detail to enable the inspector to monitor the progra's effectiveness. Areas that must be included in these reports are:

- The areas and equipment along with the dates that nonroutine cleaning occurred.
- Grain treatment for pest control for nonroutint treatement which includes identity or location of the grain treated, dates, chemical name and formulation, and application rates.
- Structural treatment for pest control identifying the areas treated, the dates, chemical name and formulation, and application rate.

Random Inspection of Registered Facilities are conducted periodically throughout the year. Inspection must be conducted every two months but can be extended for up to four months when inspection staff is not available. Facility managers are provided with 24-hour advance notice so records can be updated and facility staff can be available to accompany the inspectors. The inspection is confined to the grain path from the bin to the vessel or railcar and the required hygiene and pest-control records. Other specific areas can be examined if there have been problems noted in previous inspections.

Random Inspection of Unregistered Facilities consist of full inspection on a monthly basis if they have poor cleanliness histories, once every 2-3 months for marginal records, and 1-2 times a year for good records.

Inspecting Grain and Storage Facilities for Infestation. The Australian Wheat Board (AWB) and the Bulk Handling Authority (BHA) are responsible for delivering insect-free grain to the customer. EIS is responsible for inspecting the grain for inspection as the grain is being loaded on the vessel. Both groups have therefore developed sampling and inspection programs for detecting infestation.

EIS Inspection. EIS has established a zero tolerance for live insects based on a sampling rate of 2.25 litres per 33.3 tonnes. Inspectors employed by each State Department of Agriculture are present at export facilities and conduct onsite inspection as the grain is being loaded into the vessel.

Samples are drawn one of two ways depending on the facility. Where automatic sampling devices have been installed, they must be located in a position so that grain may be returned to the facility when infestation is detected. Automatic samplers are standardized to obtain the prescribed portion size for analysis. This is accomplished by standardizing each sampler to collect 2.25 litre every five minutes based on a grain flow rate of 400 tonnes/hour.

Where automatic samplers have not been installed, samples are drawn manually using a dipper or cup. These samples can be obtained either on a belt directly under a bin or in the gallery from the shipping belts. The cup size is 0.5 litre and is inserted into the grain stream with the opening facing the opposite direction of the grain flow. Several cup fulls are then drawn in order to obtain the correct portion size.

Grain is collected, sieved, and examined for live insects regardless of sampling method. The material passing through the sieve as well as the grain remaining on the sieve is examined for live insects in all life stages (adult, larva, and pupae). Mechanical sieving devices have been installed in some locations. These devices consist of a screen positioned at the slight angle that moves in a side-to-side and top-to-bottom motion. Grain is placed on the top of the sieve and the sieving action works the grain down the incline. Samples obtained with an automatic sampling device are fed directly to this device by opening the valve in the bottom of the collection box. Each full cup is placed on the sieve when the sample is drawn manually.

The shipping belt is immediately stopped when one live insect is found. Two samples are then drawn from the grain remaining on the shipping belt. The samples are drawn between the sampling point and head of the belt. The grain on the shipping belt can be delivered to the vessel if no live insect is found. When one live insect is found, all the grain on the belt must be returned to the facility. Grain held in scales and garners must be returned to the facility regardless of whether insects are found on the shipping belt. All bins that were open and feeding the shipping belt at the time the insects were found are rejected and the grain must be treated before it can be used.

In an effort to reduce the possible levels of infestation that can be loaded and never detected, EIS applies what it calls the "Twenty Percent Rule." This procedure requires inspectors to calculate the amount of grain that is delivered to a vessel from bins prior to their rejection. When the total amount of grain loaded from these bins exceeds 20 percent of the total cargo, loading is stopped. The Chief Entomologist at EIS is then notified and, in conjunction with the local BHA, determines the course of action to be taken.

AWB and BHA Inspections. Both the AWB and BHA use the sampling rate and zero live insect tolerance established by EIS. BHA inspection takes place at a number of points throughout the handling and storage system. All grain received into BHA facilities from farmers is sampled and inspected for insects. At approximately one month intervals, all grain being stored is inspected. Grain being loaded into railcars and trucks for shipment is also inspected. Grain shipped from one facility to another is inspected upon receipt and again as it is loaded out.

All grain received from the farmer by truck is probed and the sample sieved for infestation. The grain is rejected when one insect is found. The farmer is then responsible for treating the grain. Every month, grain being stored is surfaced probed, samples are examined for live insects, and grain temperature is determined. The grain is treated when one live insect is found. Grain stored in vertical silos is turned every two months and sampled for the presence of live insects. Again, grain is treated if it contains one live insect.

As grain is loaded into railcars and trucks, a sample is taken from the grain stream as it is discharged from the loading spout. When one live insect is found, the railcar can either be unloaded and treated or shipped to another facility unloaded and treated. Treatment of grain in railcars is prohibited. Sampling of railcars being unloaded is accomplished by placing a sieve under the railcar hopper. The sample is taken immediately after the hopper is opened. If one live insect is found, the bin where the grain is stored must be treated.

Vessel Inspection

Empty vessels used for transporting grain are required to be free from insects, pest, or contaminants and in such a condition that they will not otherwise affect the cargo. The inspections are generally carried out at the loading berth just prior to loading. In some states, the inspections can be carried out at anchorage. All vessel holds, regardless of whether they will stow grain, must pass inspection.

Inspection procedures require an inspector to enter each hold and examine it for cleanliness. In order for a hold to pass, it must meet the following standards of cleanliness:

- Zero live insects and rodents
- Substantially free from residue or previous cargoes
- Free of residue such as flaking paint or rust scale
- Dry and odor free
- Infestation in holds that will not carry grain must be controlled to the extent that cross-contamination will not take place
- Ship shore rooms must be free of infestation to the extent that cross contamination of grain in the hold will not occur
- Deck areas, mast houses, etc. must not present a cross-infestation risk

For each inspection a "Ship Inspection Report and Treatment Order" is issued (Appendix C, Document 1). When a hold is not in compliance, the inspector completes the treatment portion of the report. The report is used to inform the ship's master of the conditions that are not in compliance and the actions that must be taken to correct the problems. When chemical treatment is required, the inspector cannot dictate the chemicals to be used. Inspectors are required to provide a list of approved treatments based on whether the hold contains light or hevy infestation. Light infestation is defined as less than 50 live insects, excluding the Trogoderma spp., in any storge (adult, larvae, or purae). More than 50 live insects is considered heavy infestation. In the case of Trogoderma spp., light infestation is 1 or 2 live insects in any life stage with heavy being 3 or more.

Three types of chemical treatment have been approved for treating infested ship holds: fumigation, spraying, or fogging. Fumigation is defined as treatment with a poisonous gas that does not include insecticides propelled by carbon dioxide, smoke generators, fogging, or spraying. Spraying entails a high volume treatment using an oil-base or water base insecticide. Fogging is a high volume treatment using oil-based insecticides applied by equipment that breaks the insecticide droplets into minute particles. In holds that will carry grain, the type of treatment follows:

- Light infestation - spray the entire hold (except Trogoderma spp.) then fumigate
- Heavy infestation - fumigate
- After checking and fumigation fails - refumigate

The following insecticides have been approved for treating empty ship holds: Pyrethrins (with or without synergists such as piperonyl butoxide); Dichlorvos; Bromophos; Fenithrothion; Diazinon; Propoxur; and Azamethiphos.

Methyl bromide is the only fumigant approved for treating empty ship holds. The application rate by vessel type follows:

- Bulk carriers: not less than 24 oz./1,000 cubic feet for a minimum exposure period of 16 hours.
- Converted bulk carriers and 'tween deck ships: not less than 32 oz./ 1,000 cubic feet for a minimum exposure period of 16 hours.
- For high levels of infestation in these ships: not less than 32 oz./ 1,000 cubic feet for a minimum exposure period of 24 hours.
- In the case of Trogoderma spp.: not less than 80 oz./1,000 cubic feet for a miniumu exposure period fo 48 hours.

All holds are re-examined after they have been cleaned or treated to determine that the appropriate actions have taken place and the hold complies with the standards. A gas-free certificate is required when holds have been fumigated before inspectors can enter the hold. If insects are found in a hold after it has been sprayed or fogged, no further inspections can take place for four hours after further spraying or fogging.

D. Insecticide, Fumigation, and Other Insect Control Measures

All chemicals used to treat infested grain must be approved by the Australian government. In addition, each State has control over the chemicals and labeling requirements within its boundaries. (See Appendix C, Document 2, for an example of a phosphine label for New South Wales.) Furthermore, the AWB provides guidelines on chemical usage and application rates. This has resulted in some chemicals being approved for use on a national level while being banned in some states. In other instances, such as phosphine, each state has approved the chemical; however, each state may have different labeling requirements. In transit fumigation, either in vessels or railcars, is prohibited.

The BHA's require empty storage spaces be cleaned and sprayed with a contact insecticide prior to the receipt of grain. Grain that will be in storage more than a certain period must be treated with an insecticide upon receipt. In the case of New South Wales, this period is four weeks. Insecticides have been approved for use on specific insect species in some states. When reviewing the New South Wales publication (Appendix C, Document 3), protectants are broken down into four categories: A, B, C, and D. Depending on the insect species present, chemicals from one or more of these categories may be required.

For the purpose of this section, the following Australian definitions for protectant type insecticides and fumigants are provided along with a listing of the approved chemicals.

Protectant Type Insecticides are insecticides which are applied to grain in an admixture and provide residual protection up to the point of consumption.

Approved Insecticides

- Chlorpyrifos-methyl
- Fenitrothion
- Pirimiphos-methyl
- Bioresmethrin
- Carbaryl
- Fenvalerate
- Permethrin
- Phenothrin
- Pyrethrins
- Methacrifos
- Dichlorvos

The following insecticides, by state, were being used in 1981 according to the Working Party Report. (See Appendix C, Document 4 for recommended insecticides for New South Wales.)

Insecticide Use by State

- Fenitrothion and bioresmethrin (Queensland, New South Wales, and Victoria)
- Fenitrothion (only in South and Western Australia)
- Pyrethins on special shipments (New South Wales in place of bioresmethrin)
- Dichlorvos (South Australia and New South Wales on grain rejected for export)

Fumigants are gases or liquids which are toxic to all stages of insect life, penetrate the commodity readily, and which can be removed by airing the commodity.

Approved Fumigants, Including Controlled Atmosphere

- Methyl bromide
- Phosphine
- Hydrogen cyanide
- Carbon disulphide
- Carbon dioxide
- Nitrogen

The following fumigants, by state, were being used in 1981 according to the Working Party Report. (See Appendix C, Document 4 for recommended fumigants for New South Wales.)

Fumigant Use by State

- Methyl bromide (Queensland and New South Wales)
- Phosphine (South and Western Australia, New South Wales, and Queensland
- Hydrogen cyanide (Western Australia)
- Modified or controlled atmosphere using nitogen and carbon dioxide (Western Australia and to a limited degree in Queensland, New South Wales, and South Australia)

Aeration is being used in many location to control infestation. According to the Working Party Report, in 1981 25 percent of total Australian storage was aerated. This breaks down to 60 percent of the storage in New South Wales, 38 percent in Victoria, and 30 percent in South Australia. Queensland was planning on installing aeration in suitable facilities. Western Australia did not have aeration and no plans for installation were forthcoming.

Working Party Recommendation. The Working Pary's goal in 1981 was to recommend actions that could be taken to ensure insect-free grain. Any recommendation was to take into account the elimination of chemicals for insect control due to insect resistance and the problem of pesticide residue. The Working Party's recommendation was "Institute a program to modify three quarters of the country storage system to methods of pest control which do not rely in any way on the use of chemical protectants. Until the program of modifying storages is complete all State Authorities should continue to develop strategies aimed at extending the useful life of protectants." This recommendation was to begin in 1982 and be completed in 10 years.

All indications are that this recommendation was adopted. Research began at CSIRO on technologies for sealing upright silos, flat warehouses, and bunkers so they could be fumigated. This technology was developed and implemented at facilities suitable for sealing. Upright silos were fitted with recirculation for methyl bromide fumigation. Metal silos which are gas tight, fitted with recirculation, and can be pressure tested prior to fumigation have been constructed and installed. Modified atmosphere technology was refined and implemented in some locations. Research continues on other technologies for controlling infestation (see research section of this report).

Residue Testing

There is a major concern on the part of the Australians regarding pesticide residue levels in grain. These concerns are generated from the continued use and dependence on protectant type chemicals which leave a residue and public, as well as importing countries, concerns regarding these residues. Great emphasis is being placed on marketing grain that meets importing countries specific residue level requirements and requirements adopted by the Codex Alimentarius Commission.

Two groups continually monitor grain for the presence of pesticide residue: the Australian Government Analytical Laboratory of EIS and the AWB Laboratory. Samples from each export cargo are collected by EIS and BHA inspectors. These samples are then forwarded to their respective laboratories for residue testing. As part of the BHAs ongoing infestation inspection, samples examined at country terminals are sent to the AWB laboratory for residue testing. In addition, the AWB has developed a random survey procedure for further identifying potential problems. Both laboratories use gas chromatography technology for testing residue and test for residues from all approved chemicals along with EDB and Carbon Tetracloride. Individuals at the AWB Laboratory indicated that approximately 17,000 residue tests were performed last year.

No data was collected on the acceptable residue levels for insecticides. Data on the acceptable fumigant residue levels for raw grain is as follows:

- Methyl bromide - 50 ppm bromide ions
- Phosphine - 0.1 ppm expressed as undecomposed PH3
- Hydrogen cyanide - 75 ppm
- Carbon disulphide - 10 ppm

E. Research Areas

The Stored Grain Research Laboratory funded by CSIRO, AWB, and the BHAs carries out research and development work aimed at ensuring that Australian grain is free from pests. This laboratory pioneered the development of PVC lined bunkers that can be fumigated with phosphine; assisted in the evaluation of 12 alternative chemicals to replace malathion; developed better techniques for applying insecticides; played a key role in introducing aeration; refined methods for controlled atmosphers including development of a mobile generator for providing oxygen deficient atmosphere; and developed methods for sealing silos and warehouses.

Currently two major research areas are under investigation: flow-through phosphine fumigation and fluidized bed heating.

Flow-through phosphine fumigation is being examined for use in silos and warehouses that cannot be sealed and made gas tight. This research involves using aluminum phosphine generators to provide constant low level phosphine concentrations to unsealed silos or warehouses. According to CSIRO scientists, this technology has been tested in several unsealed silos and warehouses with great success. Work is continuing on this technology with the hope of full acceptance shortly.

Fluidized bed heating involves rapidly heating the grain to kill insects followed by rapid cooling to safe storage levels. The thrust of this research is to develop continuous flow in line systems compatible with handling rates for integration into existing facilities. A pilot plant has been built and tested with good results. The pilot plant was designed for a 100 tonne/hour capacity. CSIRO scientists stated that in test trials, this plant was able to successfully handled 200 tonne/hour. According to literature provided by CSIRO a 500 tonne/hour unit is the minimum capacity required for successful integration. Literature published in 1984 indicated that this size unit would cost $1 million (U.S.) to construct.

VII. Summary and Conclusions

Australia is the fourth largest exporter of wheat with market share ranging from 11-18 percent. Compared to other exporters production is quite volatile and a relatively large proportion of the wheat produced is exported. Yields are quite low due to a number of reasons including lack of precipitation, soil fertility, low producer prices, each of these resulting in less intensive production practices than other exporting countries. In recent years there have been sharp reductions in production primarily due to the economics of sheep production which is a very important alternative for Australia wheat producers.

There are several unique characteristics of the quality of wheat produced in Australia. It is exclusively white, with protein levels in the area of 9-11 percent. However, higher levels of protein exist for other classes but these comprise a relatively small proportion of the exports. In recent years there has been a growing concern due to the apparent reductions in crop average protein levels. The wheat is abnormally dry (9.5 percent) and has superior hygiene characteristics (low levels of impurities and nil insects). The climate in Australia is conducive to infestation problems, but these have diminished to nil due to procedures implemented over the last 10-15 years.

There are a number of important institutions and institutional relationships in Australia which determine the operation of the marketing system. The Australian Wheat Board is the key acting as virtually the sole buyer and seller of wheat (with a few exceptions discussed below). In addition the AWB has direct influence on the quality of wheat in a number of capacities. All wheat is handled and stored for the AWB by monopoly grain handling organizations in each state. As a result the AWB retains ownership throughout the marketing system.

In this section a point form summary is provided on important aspects of the marketing system and its impact on quality. Where appropriate general comparisons are made to the equivalent in the U.S. Appendix D contains comparisons to the U.S. on specific activities. Following these summary points conclusions are drawn on the major influences affecting quality. Major issues/recommendations faced by two concurrent investigations are also summarized:

1. Farm Sector. Wheat is by far the dominant crop produced in Australia. It is produced generally in a rotation including pasture and sheep. In recent years an increase in sheep and wool prices combined with lower wheat prices have resulted in a diversion away from wheat production. This has taken the form of extending the pasture component of the rotation. Climatic conditions are very dry, and combined with low prices, there is limited use of fertilizers.

2. Guaranteed Minimum Price (GMP) is the key agricultural policy in Australia and is administered by the AWB. The GMP provides a price support mechanism and is underwritten by the Commonwealth. Of particular importance is that it is through the differentials in the GMP, and also the pooling mechanism, that the AWB provides incentives and disincentives in the marketing system. In addition, given there are minor to no differentials for delivery in the post-harvest period, most of the wheat is delivered at harvest or shortly after. As a result there is minimal use of on-farm storage.

   In contrast, differentials in the U.S. are market determined. Those of the loan rate program are minimal and generally do not provide incentives for quality enhancement. Also, farm programs have generally resulted in increased on-farm storage which is more commonly practiced in the U.S.

3. Australian Wheat Board (general). The AWB is the single most important institution affecting the marketing system and quality of wheat. It is the sole buyer of wheat with the exception of that used for stock feed. It is also virtually the sole seller to both the domestic milling and export markets. However, it sells from 10-30 percent of the wheat to the private exporters who arrange export transactions to specific markets.

4. Australian Wheat Board and Wheat Quality. There are a number of mechanisms used or administered by the AWB which influence of quality of wheat produced and exported. First, development and administration of "Receival Standards" are the responsibilities of the AWB. Wheat has to meet these standards at the point of first receival, if not it is precluded and destined to the feed market. An important underlying principal of the marketing system is that applying stringent standards at the point of first sale generally mitigates problems downstream in the marketing system. This is in contrast to the U.S. which in general the standards are normally only applied at export.

Price differentials for different quality parameters are established by the AWB through the GMP mechanism discussed above, and/or the pooling mechanism. There are price differences for class and grade, and variety in some cases. This is the key mechanism used by the AWB to provide incentives to improve or maintain the quality of wheat. The discount on excessive unmillable material, for example, is generally sufficient to induce harvesting wheat with a lower level of unmillable material. Wheat with excessive unmillable material is either: (1) accepted into the system, valued and marketed as GP or Feed; or (2) used on-farm or sold domestically as feed.

The "Variety Control Scheme" (VCS) also administered to facilitate segregation by classes, and to provide incentives via price differentials. The VCS is not regulatory but is used to identify variety at the point of delivery, which then is used for segregation into classes. Administration of the VCS is dependent on producers declaring the variety at delivery.

In the U.S. no mechanisms exist for vriety identification. Thus, classification is done by protein level and other factors not necessarily reflecting end-use value.

In addition to the above, an important characteristic of marketing in Australia is that wheat, once received into the Bulk Handling Authority (BHA) system, is the property of the AWB. These BHA's operate under contract with the AWB in part to maintain quality, but they do not take ownership. As a result there are only two transactions in the marketing system, one between grower and AWB, the other between the AWB and importer. Thus, the benefits of restrictive quality control can be internalized. For these reasons there is limited blending between grades or loading to factor limits. This is compared to the U.S. in which there are multiple transactions each of which requires quality evaluations and are subject to factor limits.

5. Quality. There are seven classes of wheat produced and marketed in Australia including Price Hard (APH), Hard (AH), Australia Standard White (ASW), Soft, Durum, General Purpose (GP), and Feed. Some of these are further segregated by protein level, or the level of non-millable materials. Protein is an important distinguishing characteristic between classes, and APH and AH are further segregated by protein. Recently the AWB is investigating protein segregations withing ASW, in response the apparent reduced protein levels in recent years. Wheat in Australia is exclusively white and generally heavier than that of other exporters resulting in higher extraction rates.

   Wheat in Australia is noted for its high standard of "hygiene"--i.e., cleanliness and lack of infestations. Unmillable material levels are generally less than 4/10 percent. This degree of cleanliness is assured by the combined effects of the receival standards, substantial price differentials, and harvesting technology which has adapted. These result in incentives to use "second screens" (2mm) on combines during harvest. The differentials are also great enough to clean commercially if needed.

   The climate in Australia is compatible to proliferation of insects. However, infestation problems have virtually been eliminated in recent years, alleddedly due to: (1) nil tolerances at first sale; (2) integrated procedures used throughout the marketing system, and (3) limited use of on-farm storage.

6. Grain Handling. An important institutional relationship exists in Australia in which a monopoly exists in each state charged with the responsibility of grain handling and storage (BHA). The institutional relationship is that the AWB contracts with the BHA in each state exclusively to provide services, part of which is to preserve the condition of wheat. However, as indicated above the AWB retains ownership throughout the system. Thus, any benefits from quality preservation or conditioning are internalized.

   Due to pricing policies and tradition the storage system has developed to comprise relatively little on-farm storage. However, extensive storage and handling capacity exists within the marketing system. As a result most wheat is delivered into the marketing system at or near harvest, conditioned by the BHA's and stored within the BHA's.

Wheat is segregated at the country elevator level by grade/class, which in part are reflective of variety. However, design of the marketing system which includes high volume storage generally precludes increased segregations, even though increased segregations within ASW have been proposed. Blending is very limited at the country elevator due to lack of incentive (i.e., the BHA doesn't own the wheat and could not benefit from doing so) and possibly due to infrastructure. Export elevators do blend, but it is limited to a few factors and because of the inbound segregation. Wheat is not cleaned within the BHAs due to administration of standards and price differentials discussed above. Dust is removed, but not re-introduced into the stream.

7. Variety Development and Release. Plant breeding is predominately by the public sector. A formal mechanism is followed as a prerequisite for release of varieties. Ultimately the Minister of Agriculture in each state prescribes varieties which can be marketed (not necessarily produced) from each region. The AWB is involved in several ways: (1) it is on the committee which recommends varieties to the Minister of Agriculture; (2) it has provided broad guidelines for breeders to achieve uniformity, and (3) it prescribes discounts which can apply for varieties in particular locations.

The quality of wheat exported from Australia is the result of a multi-faceted approach to marketing and regulations. Important factors influencing the quality of wheat exported include (but are not limited to): (1) variety development and release, (2) variety identification in marketing; (3) stringent receival standards administered at the point of first sale; (4) administered price differentials to provide incentives; (5) an institutional relationship which allows ownership of wheat to be divorced from handling; (6) nil tolerances for insects throughout the system; and (7) limited on-farm storage. These factors have directly or indirectly influenced the marketing practices which affect the quality of wheat being exported. However, at least some of these have created problems for the marketing system which are the subject of two concurrent investigations in Australia. There are a multitude of issues being addressed by these commissions, two of which are of particular concern. One is whether, or the extent, that the AWB is capable of commanding premiums for the quality of wheat being exported from Australia (Industry Assistance Commission). The other is an investigation into factors contributing to the relatively high, and escalating costs of grain handling and transportaion in Australia (Royal Commission). At least a part of these costs can be attributable to the constraints imposed on the system due to the quality control measures.

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APPENDIX A

STATISTICAL TABLES

TABLE 2.1. PRODUCTION OF WHEAT (000 MT)

Season[1]	New South Wales[2]	Victoria	South Australia	Western Australia	Queensland	Tasmania	Australia
1976-77	5,142	1,789	832	3,249	794	4	11,800
1977-78	3,946	1,497	511	2,945	569	2	9,370
1978-79	6,640	2,998	2,086	4,400	1,962	3	18,090
1979-80	6,001	3,250	2,349	3,739	846	4	16,188
1980-81	2,865	2,538	1,650	3,315	485	3	10,856
1981-82	5,910	2,467	1,695	4,803	1,482	3	16,360
1982-83	1,500	394	692	5,534	755	1	8,876
1983-84	8,961	3,971	2,843	4,316	1,922	3	22,016
1984-85	5,805	2,666	2,031	6,580	1,579	4	18,666
1985-86	5,911	2,225	1,879	4,377	1,730	4	16,127
Ten Season Average	5,258	2,380	1,657	4,326	1,212	3	14,835

[1] October 1 to September 30.
[2] Including A.C.T.

SOURCE: Australian Wheat Board, Annual Report 1985/86.

Table 2.2. Australia Wheat Supplies and Dissappearance for Crop Years 1961/62 - 1987/88 (million metric tons)

	Supply			Disappearance			
Year	Beginning Stocks	Production	Total	Domestic	Exports	Total	End-of-Year Carryover
1961/62	0.7	6.7	7.4	2.1	4.8	6.9	0.5
1962/63	0.5	8.4	8.8	2.0	6.2	8.2	0.6
1963/64	0.6	8.9	9.6	2.1	6.9	9.0	0.6
1964/65	0.6	10.0	10.6	2.7	7.3	9.9	0.7
1965/66	0.7	7.1	7.7	2.5	4.8	7.3	0.5
1966/67	0.5	12.7	13.2	2.4	8.5	11.0	2.2
1967/68	2.2	7.5	9.7	2.7	5.7	8.3	1.4
1968/69	1.4	14.8	16.2	2.3	6.7	8.9	7.3
1969/70	7.3	10.5	17.8	2.4	8.2	10.6	7.2
1970/71	7.2	7.9	15.1	2.7	9.0	11.7	3.4
1971/72	3.4	8.6	12.0	2.8	7.8	10.6	1.5
1972/73	1.5	6.6	8.0	3.4	4.1	7.6	0.5
1973/74	0.5	12.0	12.5	3.2	7.4	10.6	1.9
1974/75	1.9	11.4	13.2	3.0	8.5	11.6	1.7
1975/76	1.7	12.0	13.6	2.7	8.2	11.0	2.7
1976/77	2.7	11.8	14.5	2.6	9.8	12.3	2.1
1977/78	2.1	9.4	11.5	2.6	8.1	10.7	0.8
1978/79	0.8	18.1	18.9	2.5	11.7	14.2	4.6
1979/80	4.6	16.2	20.8	3.4	13.2	16.6	4.3
1980/81	4.3	10.9	15.1	3.5	9.6	13.1	2.0
1981/82	2.0	16.3	18.4	2.4	11.0	13.4	4.9
1982/83	4.9	8.8	13.8	4.2	7.3	11.5	2.3
1983/84	2.3	22.0	24.3	2.6	14.2	16.7	7.6
1984/85	7.6	18.3	25.9	2.6	15.1	17.3	8.6
1985/86	8.6	16.6	25.1	2.9	16.1	17.9	7.3
1986/87	7.3	16.8	24.1	2.7	14.8	17.5	6.6
1987/88	4.0	13.0	17.0	2.8	11.0	13.8	3.2

1987/88 data is preliminary.

Source: World Wheat Statistics, various years, London for 1961/62 - 1985/86, 1986/87 - 1987/88 from IWC Market Report and FAS FG13-87, World Grain Situation Outlook.

Table 2.3. Area Planted by Major Exportors (in Million Hectares)

Year	EC10	France	Canada	US	Argentina	Australia
1962	12.0	4.6	10.9	17.6	3.4	6.7
1963	11.0	3.8	11.2	18.3	5.7	6.7
1964	11.7	4.4	12.0	20.1	6.1	7.3
1965	11.9	4.5	11.5	20.1	4.6	7.1
1966	11.1	4.0	12.0	20.2	5.2	8.4
1967	10.8	3.9	12.2	23.7	5.8	9.1
1968	11.4	4.1	11.9	22.4	5.8	10.8
1969	11.1	4.0	10.1	19.1	5.2	9.5
1970	10.9	3.7	5.1	17.6	3.7	6.5
1971	11.1	4.0	7.9	19.3	4.3	7.1
1972	12.0	3.9	8.6	19.1	5.0	7.6
1973	11.7	4.0	9.4	21.9	3.9	8.9
1974	12.2	4.1	8.9	26.5	4.2	8.3
1975	11.4	3.9	9.5	28.1	5.3	8.6
1976	12.1	4.3	11.3	28.7	6.4	9.0
1977	11.0	4.1	10.1	27.0	3.9	10.0
1978	12.0	4.2	10.6	22.9	4.7	10.2
1979	12.0	4.1	10.5	25.3	4.8	11.2
1980	12.6	4.6	11.1	28.8	5.0	11.3
1981	12.7	4.7	12.4	32.6	5.9	11.9
1982	13.0	4.8	12.6	31.5	7.3	11.5
1983	13.2	4.8	13.7	24.8	7.1	12.9
1984	13.6	5.1	13.2	27.1	5.9	12.0
1985	13.0	4.8	13.7	26.2	5.3	11.7
1986	12.7	4.7	14.2	24.6	5.1	11.3
1987	.	.	13.5	22.4	5.0	10.0

Source: World Wheat Statistics, various years, London.
Data for 1986 and 1987 from FAS and Toepfer.

Table 2.4. Domestic Disappearance Expressed as a Percent of Total Disappearance

Year	EC10	US	Canada	Australia	Argentina
1961/62	89.4	45.8	28.4	29.8	56.3
1962/63	86.9	47.5	29.4	24.3	65.9
1963/64	87.6	40.7	20.9	23.4	51.8
1964/65	83.0	47.0	26.9	26.8	36.8
1965/66	82.6	45.7	21.2	34.7	40.1
1966/67	86.1	47.5	23.7	22.2	59.1
1967/68	85.3	45.4	31.7	32.1	65.5
1968/69	86.7	57.5	35.0	25.2	65.0
1969/70	84.7	56.0	32.6	22.7	64.6
1970/71	91.9	51.0	28.2	22.7	81.5
1971/72	88.4	57.5	25.9	26.5	75.2
1972/73	86.6	39.9	23.3	45.3	63.9
1973/74	88.3	39.5	28.7	29.9	72.1
1974/75	83.6	39.5	29.8	26.2	72.7
1975/76	79.8	38.1	28.0	25.0	64.5
1976/77	88.7	44.1	26.4	20.8	40.7
1977/78	87.5	43.3	23.8	24.5	73.4
1978/79	81.9	41.2	28.7	17.8	48.1
1979/80	79.3	36.3	25.7	20.3	45.7
1980/81	74.8	34.1	24.2	26.5	55.7
1981/82	74.2	32.4	22.0	18.1	56.3
1982/83	74.7	37.6	19.3	36.6	33.8
1983/84	74.6	43.7	20.3	15.4	38.4
1984/85	73.6	44.7	23.5	15.0	34.6
1985/86	77.3	54.4	24.4	16.0	50.0
1986/87	.	.	.	15.4	.
1987/88	.	.	.	20.3	.

Source: World Wheat Statistics, various years, London.

TABLE 2.5 DOMESTIC USES OF WHEAT BY TYPE OF FLOUR, 1982-87[a]

Uses	1982	1983	1984	1985	1986	1987
	---------------------percent---------------------					
Industrial						
Starch/Gluten Mfg.	20.1	18.6	20.6	22.7	24.0	22.3
Other	1.3	0.8	.3	.2	.1	.2
Human Consumption						
Bread Bakers	54.3	55.0	48.6	47.4	45.8	44.8
Pasts Cooks	NA	NA	9.1	8.8	7.8	7.5
Biscuit	7.0	7.3	6.7	16.4	6.7	7.1
Pasta	3.3	3.1	3.3	3.1	3.3	3.4
Packeted Flour & Mixes	8.8	8.3	6.5	7.4	6.4	6.8
Food	4.2	5.8	5.0	4.0	5.9	7.9
Total (000 MT)	1,043	1,036	1,123	1,139	1,144	1,208
Export (000 MT)	102	91	63	61	61	73
Grand Total (MMT)	1,145	1,126	1,187	1,200	1,205	1,281

[a] Crop year ending June 30.

SOURCE: Survey conducted by Bread Research Institute, Sydney.

Table 2.6. Exports as Percent of Production for Major Exportors

Year	EC10	US	Canada	Australia	Argentina
1961/62	13.7	58.4	126.3	72.0	47.7
1962/63	13.5	58.8	58.6	74.5	32.6
1963/64	15.4	74.7	82.2	77.3	39.0
1964/65	19.4	56.5	66.6	72.4	56.9
1965/66	19.1	65.9	90.1	67.3	91.1
1966/67	16.9	57.0	62.3	67.1	35.2
1967/68	15.3	50.5	56.7	75.0	30.7
1968/69	15.8	35.0	47.1	45.2	43.1
1969/70	20.5	42.0	51.6	77.7	32.6
1970/71	10.3	54.6	131.3	114.7	17.2
1971/72	13.2	39.1	95.1	90.2	28.5
1972/73	16.4	76.6	108.1	62.8	39.2
1973/74	13.0	67.4	70.6	61.9	22.8
1974/75	17.5	57.9	81.0	75.3	28.7
1975/76	25.2	55.3	72.2	68.7	36.1
1976/77	12.4	44.4	57.0	82.7	53.0
1977/78	14.7	54.9	80.8	86.4	31.6
1978/79	19.0	67.2	61.9	64.6	49.3
1979/80	23.6	64.4	92.4	81.5	58.3
1980/81	27.4	63.6	84.3	88.6	45.0
1981/82	29.1	63.6	74.4	67.4	45.8
1982/83	25.4	54.6	79.9	82.5	65.3
1983/84	27.7	59.0	82.1	64.3	59.7
1984/85	24.7	54.9	82.7	82.5	68.4
1985/86	24.1	37.5	75.3	97.3	50.6
1986/87	.	.	.	88.1	.
1987/88	.	.	.	84.6	.

Source: World Wheat Statistics, various years, London.

Table 2.7. End-of-Year Carryover Expressed as a Percent of Production

Year	EC10	US	Canada	Australia	Argentina
1961/62	27.5	107.3	138.0	7.4	4.2
1962/63	27.7	109.5	86.2	7.5	8.8
1963/64	25.0	78.6	63.5	6.2	24.8
1964/65	19.1	63.7	85.4	6.6	29.7
1965/66	22.2	40.7	64.7	6.4	2.9
1966/67	20.5	32.5	69.1	17.3	10.0
1967/68	24.3	35.7	113.4	18.6	20.1
1968/69	24.6	52.5	131.1	49.0	9.3
1969/70	15.3	61.3	150.3	68.4	15.6
1970/71	17.3	54.1	221.4	43.1	29.5
1971/72	18.6	53.3	110.2	16.9	11.6
1972/73	11.8	28.3	68.5	7.3	3.8
1973/74	14.3	14.5	62.4	15.7	22.8
1974/75	23.2	18.2	60.4	14.6	19.7
1975/76	21.9	31.3	46.7	22.2	12.1
1976/77	21.7	51.9	56.5	18.1	20.2
1977/78	18.9	57.6	61.0	8.3	23.0
1978/79	20.8	52.0	70.5	25.7	19.9
1979/80	17.7	42.3	62.3	26.4	12.6
1980/81	15.8	41.5	44.4	18.8	11.6
1981/82	13.5	41.6	39.2	30.2	6.0
1982/83	18.1	54.8	37.3	25.9	4.6
1983/84	14.5	57.8	34.7	34.3	8.5
1984/85	20.8	54.9	35.2	47.0	3.4
1985/86	22.2	77.1	31.6	44.0	4.3
1986/87	.	.	.	39.3	.
1987/88	.	.	.	24.6	.

Source: World Wheat Statistics, various years, London.

Table 2.8. Percent of Total Wheat Production by Major Exporters for Calander Year (in MMT)

Year	EC10	Canada	US	Argentina	Australia
1946	12.99	7.85	21.81	3.89	2.22
1947	8.52	6.55	26.06	4.58	4.23
1948	12.82	6.63	22.29	3.28	3.28
1949	14.66	6.29	18.82	3.21	3.71
1950	13.87	7.62	16.45	3.48	3.00
1951	12.65	8.85	15.76	1.23	2.58
1952	11.95	9.35	17.43	3.72	2.60
1953	13.13	8.51	15.68	3.05	2.65
1954	13.64	4.62	13.74	3.95	2.36
1955	14.04	6.83	12.35	2.57	2.57
1956	10.42	6.89	12.10	3.13	1.59
1957	13.46	4.83	11.74	2.62	1.22
1958	11.66	4.27	15.69	2.65	2.33
1959	12.88	4.98	12.51	2.39	2.22
1960	12.33	5.85	15.32	1.66	3.07
1961	12.51	3.39	14.76	2.51	2.95
1962	14.08	5.97	11.52	2.21	3.26
1963	12.55	8.19	12.97	3.70	3.57
1964	12.75	5.91	12.64	4.09	3.62
1965	14.17	6.67	13.49	2.30	2.68
1966	10.51	7.23	11.48	1.99	4.08
1967	12.67	5.37	13.80	2.43	2.50
1968	11.61	5.32	12.91	1.71	4.45
1969	11.80	5.81	12.47	2.22	3.33
1970	11.48	2.82	11.54	1.54	2.48
1971	11.86	4.07	12.45	1.52	2.43
1972	12.44	4.17	12.09	2.27	1.90
1973	11.47	4.31	12.40	1.76	3.19
1974	13.06	3.66	13.33	1.65	3.13
1975	11.14	4.76	16.12	2.39	3.34
1976	9.76	5.55	13.76	2.59	2.78
1977	10.38	5.15	14.42	1.37	2.43
1978	11.15	4.68	10.71	1.80	4.01
1979	11.38	4.01	13.55	1.89	3.78
1980	12.37	4.31	14.55	1.75	2.45
1981	11.95	5.46	16.68	1.83	3.61
1982	12.45	5.54	15.62	3.11	1.85
1983	12.04	5.36	13.33	2.63	4.43
1984	14.71	4.10	13.66	2.63	3.60
1985	13.07	4.75	13.11	1.69	3.20

Source: World Wheat Statistics, various years, London.

Table 2.9. Total Wheat Exports by Major Exportors (MMT)

Year	EC*	US	Canada	Australia	Argentina	Total
1963/64	3.8	23.1	15.1	7.8	2.8	55.8
1964/65	5.4	19.6	11.9	6.5	4.4	50.5
1965/66	5.5	23.4	14.8	5.7	7.9	62.0
1966/67	4.2	20.0	14.8	7.0	3.1	55.8
1967/68	4.4	20.2	8.9	7.0	1.4	51.2
1968/69	5.0	14.7	8.7	5.4	2.8	45.7
1969/70	7.2	16.5	9.0	7.3	2.1	50.7
1970/71	3.1	19.8	11.6	9.5	1.7	54.3
1971/72	4.7	16.9	13.7	8.7	1.3	52.5
1972/73	6.5	32.0	15.6	5.6	3.5	68.3
1973/74	5.5	31.1	11.7	5.5	1.1	63.1
1974/75	7.1	28.3	11.2	8.0	2.2	63.4
1975/76	7.7	31.5	12.1	8.1	3.1	66.5
1976/77	3.9	26.4	12.9	8.4	5.6	61.8
1977/78	4.5	31.5	15.9	11.1	2.7	72.4
1978/79	7.4	32.4	13.5	7.2	3.3	71.7
1979/80	10.3	36.6	15.0	15.4	4.7	86.0
1980/81	12.7	42.1	17.0	11.1	3.9	94.0
1981/82	14.0	49.3	17.8	11.4	4.3	100.7
1982/83	14.1	39.3	21.1	8.5	7.5	96.1
1983/84	14.9	38.3	21.2	11.6	9.6	100.3
1984/85	17.2	38.2	19.1	15.1	8.0	104.1
1985/86	15.0	25.1	17.6	16.1	6.3	87.0
1986/87	15.0	27.3	20.8	14.9	4.3	90.1
1987/88	16.0	33.3	21.0	13.0	5.0	95.8

*Six original member states to 1967/68, nine member states to 1980/81, ten member states to December 1985, thereafter 12 members.

Source: World Wheat Statistics, various years, London,
1986/87 From FAS(FG-9-87)

Table 2.10. Market Shares of Total Wheat Exports by Major Exportors

Year	EC*	US	Canada	Australia	Argentina
1963/64	6.8	41.4	27.1	14.0	5.0
1964/65	10.7	38.8	23.6	12.9	8.7
1965/66	8.9	37.7	23.9	9.2	12.7
1966/67	7.5	35.8	26.5	12.5	5.6
1967/68	8.6	39.5	17.4	13.7	2.7
1968/69	10.9	32.2	19.0	11.8	6.1
1969/70	14.2	32.5	17.8	14.4	4.1
1970/71	5.7	36.5	21.4	17.5	3.1
1971/72	9.0	32.2	26.1	16.6	2.5
1972/73	9.5	46.9	22.8	8.2	5.1
1973/74	8.7	49.3	18.5	8.7	1.7
1974/75	11.2	44.6	17.7	12.6	3.5
1975/76	11.6	47.4	18.2	12.2	4.7
1976/77	6.3	42.7	20.9	13.6	9.1
1977/78	6.2	43.5	22.0	15.3	3.7
1978/79	10.3	45.2	18.8	10.0	4.6
1979/80	12.0	42.6	17.4	17.9	5.5
1980/81	13.5	44.8	18.1	11.8	4.1
1981/82	13.9	49.0	17.7	11.3	4.3
1982/83	14.7	40.9	22.0	8.8	7.8
1983/84	14.9	38.2	21.1	11.6	9.6
1984/85	16.5	36.7	18.3	14.5	7.7
1985/86	17.2	28.9	20.2	18.5	7.2
1986/87	16.6	30.3	23.1	16.5	4.8
1987/88	16.7	34.8	21.9	13.6	5.2

*Six original member states to 1967/68, nine member states to 1980/81, ten member states to December 1985, thereafter 12 members.

Source: World Wheat Statistics, various years, London.
1986/87 From FAS(FG-9-87)

Table 2.11. Exports of Wheat to Major Australia Destinations (000 MT)

Country = USSR

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	.	1,105	.	1,105
1970/71	.	.	.	315	.	315
1971/72	18	.	502	2,821	.	3,409
1972/73	704	9,468	908	4,168	.	15,899
1973/74	1	2,725	17	1,596	29	4,389
1974/75	.	978	656	313	680	2,828
1975/76	.	3,966	1,328	3,151	1,155	10,153
1976/77	.	2,869	368	1,183	139	4,559
1977/78	.	3,274	255	1,688	1,123	6,340
1978/79	5	2,967	136	1,892	.	5,024
1979/80	717	3,000	2,465	4,464	2,975	14,911
1980/81	685	3,920	2,741	1,806	2,021	11,686
1981/82	1,727	6,876	2,348	4,779	3,104	19,645
1982/83	3,396	3,036	1,004	6,953	4,218	20,140
1983/84	4,274	4,357	1,535	5,762	3,605	20,560
1984/85	6,078	6,123	2,040	7,633	4,057	28,156

Country = CHINA

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	764	.	2,446	1,830	.	5,040
1970/71	4	.	1,310	2,346	.	3,660
1971/72	.	.	.	2,967	.	2,967
1972/73	.	591	324	4,374	.	5,289
1973/74	26	3,190	1,239	1,367	.	5,831
1974/75	180	1,496	1,244	2,366	210	5,496
1975/76	.	.	1,126	1,204	.	2,330
1976/77	.	.	750	1,929	477	3,156
1977/78	.	225	4,603	3,321	373	8,522
1978/79	.	2,610	1,382	3,181	885	8,058
1979/80	90	1,929	3,575	2,647	465	8,706
1980/81	607	8,662	1,397	2,911	200	13,776
1981/82	116	8,054	1,413	2,991	199	13,223
1982/83	1,410	4,186	1,170	4,242	1,956	12,936
1983/84	137	3,131	1,660	3,848	1,010	9,786
1984/85	82	2,455	1,426	2,792	675	7,429

Country = EGYPT

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	1,717	14	.	57	.	2,401
1970/71	857	16	1,275	441	.	3,013
1971/72	599	5	1,801	64	.	2,698
1972/73	1,643	283	729	30	.	3,048
1973/74	1,230	798	736	.	.	3,189
1974/75	1,601	750	848	.	15	3,394
1975/76	1,482	1,225	1,025	.	.	3,759
1976/77	686	2,059	1,034	211	64	4,109
1977/78	754	1,902	1,246	540	.	4,637
1978/79	1,513	1,967	1,253	154	.	5,541
1979/80	2,362	2,531	1,846	12	.	6,755
1980/81	1,619	1,808	1,689	37	.	5,156
1981/82	1,050	3,020	1,587	352	.	6,012
1982/83	1,063	3,120	1,819	22	24	6,188
1983/84	2,182	2,767	1,704	596	50	7,331

1984/85	1,628	2,453	2,208	461	.	6,819

Country = JAPAN

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	34	2,382	980	1,068	8	4,470
1970/71	.	2,878	821	1,025	.	4,728
1971/72	.	2,195	1,466	1,388	.	5,049
1972/73	.	3,377	717	1,364	80	5,562
1973/74	.	3,067	472	1,692	32	5,266
1974/75	.	3,079	963	1,187	37	5,262
1975/76	4	334	1,052	1,601	.	6,001
1976/77	.	3,280	1,076	1,321	.	5,677
1977/78	.	3,180	1,158	1,352	.	5,690
1978/79	.	3,187	1,161	1,236	.	5,584
1979/80	.	3,204	1,068	1,290	.	5,562
1980/81	.	3,525	914	1,463	28	5,930
1981/82	1	3,358	943	1,335	.	5,637
1982/83	12	3,294	934	1,357	.	5,597
1983/84	.	3,441	1,043	1,416	.	5,901
1984/85	.	3,324	1,039	1,385	.	5,748

Country = REP OF KOREA

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	6	1,098	.	37	.	1,141
1970/71	.	1,684	27	.	.	1,711
1971/72	3	1,754	361	.	.	2,123
1972/73	12	1,621	.	.	.	1,633
1973/74	6	158	2	.	.	1,596
1974/75	.	1,733	.	.	.	1,733
1975/76	.	1,476	.	19	.	1,495
1976/77	.	1,984	21	55	.	2,067
1977/78	.	1,717	21	48	.	1,786
1978/79	.	1,671	.	31	.	1,702
1979/80	.	1,791	.	3	.	1,794
1980/81	.	2,055	.	17	.	2,072
1981/82	.	1,881	25	.	.	1,907
1982/83	.	1,750	.	53	.	1,804
1983/84	53	1,986	418	6	.	2,510
1984/85	.	2,070	973	.	.	3,043

Country = IRAQ

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	55	28	.	85
1970/71	.	8	436	322	.	828
1971/72	7	.	192	44	.	298
1972/73	.	.	.	.	.	.
1973/74	.	459	116	1	.	576
1974/75	1	.	255	183	.	439
1975/76	.	107	340	133	.	580
1976/77	.	58	529	200	92	969
1977/78	17	532	537	245	.	1,681
1978/79	.	488	481	3	.	1,467
1979/80	40	138	575	467	94	1,366
1980/81	30	472	1,187	488	.	2,300
1981/82	181	49	816	230	277	1,577
1982/83	205	925	403	310	50	1,900
1983/84	296	1,171	859	632	.	2,960

Year	EC	US	Australia	Canada	Argentina	Total
1984/85	189	868	1,216	367	.	2,836

Country = IRAN

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	.	.	.	.
1970/71	.	240	295	.	.	535
1971/72	2	588	397	.	.	1,009
1972/73	.	503	.	.	.	603
1973/74	.	584	.	.	.	584
1974/75	57	1,735	424	.	.	2,217
1975/76	13	150	108	.	.	271
1976/77	43	1,207	.	.	.	1,250
1977/78	.	1,100	.	.	.	1,278
1978/79	4	977	.	.	1	1,061
1979/80	52	223	718	42	88	1,173
1980/81	335	405	701	163	.	1,896
1981/82	66	728	510	73	.	1,377
1982/83	.	.	848	63	504	1,959
1983/84	26	.	1,291	440	1,498	3,639
1984/85	143	.	1,740	24	565	2,643

Country = BANGLADESH

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	.	.	.	.	.	.
1970/71	.	.	.	.	.	.
1971/72	3	362	14	86	.	1,115
1972/73	157	745	53	224	555	1,734
1973/74	245	730	277	341	73	1,716
1974/75	632	790	299	332	18	2,121
1975/76	232	533	83	152	.	1,000
1976/77	230	376	109	90	.	805
1977/78	241	491	147	297	.	1,183
1978/79	197	552	52	365	.	1,221
1979/80	191	210	109	136	.	659
1980/81	145	1,178	448	396	.	2,172
1981/82	301	560	123	179	.	1,165
1982/83	368	718	49	428	.	1,564
1983/84	206	443	510	451	.	1,632
1984/85	239	1,576	262	56	7	2,189

Country = INDONESIA

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	120	426	74	18	.	655
1970/71	82	416	71	34	28	634
1971/72	117	182	116	38	.	456
1972/73	76	495	75	49	.	699
1973/74	75	315	135	75	.	618
1974/75	55	98	598	75	.	829
1975/76	47	537	316	21	.	921
1976/77	.	390	543	151	.	1,084
1977/78	32	417	569	3	.	1,021
1978/79	15	705	518	.	.	1,238
1979/80	7	715	772	24	.	1,518
1980/81	7	737	551	.	.	1,295
1981/82	12	927	558	32	.	1,529
1982/83	182	801	368	156	26	1,534
1983/84	25	1,094	440	.	25	1,583

1984/85	16	625	502	200	74	1,416

Country = MALAYSIA

Year	EC	US	Australia	Canada	Argentina	Total
1969/70	67	14	492	24	.	599
1970/71	.	24	590	17	.	637
1971/72	.	.	310	14	.	327
1972/73	1	12	346	19	.	382
1973/74	3	16	291	16	.	336
1974/75	[illegible]	.	289	.	.	296
1975/76	.	.	323	.	.	331
1976/77	.	17	393	7	.	426
1977/78	.	59	377	3	.	439
1978/79	.	62	406	20	.	488
1979/80	.	41	371	.	.	412
1980/81	.	79	403	19	.	501
1981/82	.	132	407	.	.	540
1982/83	14	116	329	5	.	464
1983/84	.	117	428	.	.	545
1984/85	.	72	347	72	64	555

Source: World Wheat Statistics, various years, London.

Table 2.12. Market Share of Wheat to Major Australia Destinations

Country = USSR

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	.	100.0	.
1970/71	.	.	.	100.0	.
1971/72	0.5	.	14.7	82.8	.
1972/73	4.4	59.6	5.7	26.2	.
1973/74	0.0	62.1	0.4	36.4	0.7
1974/75	.	34.6	23.2	11.1	24.0
1975/76	.	39.1	13.1	31.0	11.4
1976/77	.	62.9	8.1	25.9	3.0
1977/78	.	51.6	4.0	26.6	17.7
1978/79	0.1	59.1	2.7	37.7	.
1979/80	4.8	20.1	16.5	29.9	20.0
1980/81	5.9	33.5	23.5	15.5	17.3
1981/82	8.8	35.0	12.0	24.3	15.8
1982/83	16.9	15.1	5.0	34.5	20.9
1983/84	20.8	21.2	7.5	28.0	17.5
1984/85	21.6	21.7	7.2	27.1	14.4

Country = CHINA

Year	EC	US	Australia	Canada	Argentina
1969/70	15.2	.	48.5	36.3	.
1970/71	0.1	.	35.8	64.1	.
1971/72	.	.	.	100.0	.
1972/73	.	11.2	6.1	82.7	.
1973/74	0.4	54.7	21.2	23.4	.
1974/75	3.3	27.2	22.6	43.0	3.8
1975/76	.	.	48.3	51.7	.
1976/77	.	.	23.8	61.1	15.1
1977/78	.	2.6	54.0	39.0	4.4
1978/79	.	32.4	17.2	39.5	11.0
1979/80	1.0	22.2	41.1	30.4	5.3
1980/81	4.4	62.9	10.1	21.1	1.5
1981/82	0.9	60.9	10.7	22.6	1.5
1982/83	10.9	32.4	9.0	32.8	15.1
1983/84	1.4	32.0	17.0	39.3	10.3
1984/85	1.1	33.0	19.2	37.6	9.1

Country = EGYPT

Year	EC	US	Australia	Canada	Argentina
1969/70	71.5	0.6	.	2.4	.
1970/71	28.4	0.5	42.3	14.6	.
1971/72	22.2	0.2	66.8	2.4	.
1972/73	53.9	9.3	23.9	1.0	.
1973/74	38.6	25.0	23.1	.	.
1974/75	47.2	22.1	25.0	.	0.4
1975/76	39.4	32.6	27.3	.	.
1976/77	16.7	50.1	25.2	5.1	1.6
1977/78	16.3	41.0	26.9	11.6	.
1978/79	27.3	35.5	22.6	2.8	.
1979/80	35.0	37.5	27.3	0.2	.
1980/81	31.4	35.1	32.8	0.7	.
1981/82	17.5	50.2	26.4	5.9	.
1982/83	17.2	50.4	29.4	0.4	0.4
1983/84	29.8	37.7	23.2	8.1	0.7

1984/85	23.9	36.0	32.4	6.8

Country = JAPAN

Year	EC	US	Australia	Canada	Argentina
1969/70	0.8	53.3	21.9	23.9	0.2
1970/71	.	60.9	17.4	21.7	.
1971/72	.	43.5	29.0	27.5	.
1972/73	.	60.7	12.9	24.5	1.4
1973/74	.	58.2	9.0	32.1	0.6
1974/75	.	58.5	18.3	22.6	0.7
1975/76	0.1	5.6	17.5	26.7	.
1976/77	.	57.8	19.0	23.3	.
1977/78	.	55.9	20.4	23.8	.
1978/79	.	57.1	20.8	22.1	.
1979/80	.	57.6	19.2	23.2	.
1980/81	.	59.4	15.4	24.7	0.5
1981/82	0.0	59.6	16.7	23.7	.
1982/83	0.2	58.9	16.7	24.2	.
1983/84	.	58.3	17.7	24.0	.
1984/85	.	57.8	18.1	24.1	.

Country = REP OF KOREA

Year	EC	US	Australia	Canada	Argentina
1969/70	0.5	96.2	.	3.2	.
1970/71	.	98.4	1.6	.	.
1971/72	0.1	82.6	17.0	.	.
1972/73	0.7	99.3	.	.	.
1973/74	0.4	9.9	0.1	.	.
1974/75	.	100.0	.	.	.
1975/76	.	98.7	.	1.3	.
1976/77	.	96.0	1.0	2.7	.
1977/78	.	96.1	1.2	2.7	.
1978/79	.	98.2	.	1.8	.
1979/80	.	99.8	.	0.2	.
1980/81	.	99.2	.	0.8	.
1981/82	.	98.6	1.3	.	.
1982/83	.	97.0	.	2.9	.
1983/84	2.1	79.1	16.7	0.2	.
1984/85	.	68.0	32.0	.	.

Country = IRAQ

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	64.7	32.9	.
1970/71	.	1.0	52.7	38.9	.
1971/72	2.3	.	64.4	14.8	.
1972/73	.	.	.	.	.
1973/74	.	79.7	20.1	0.2	.
1974/75	0.2	.	58.1	41.7	.
1975/76	.	18.4	58.6	22.9	.
1976/77	.	6.0	54.6	20.6	9.5
1977/78	1.0	31.6	31.9	14.6	.
1978/79	.	33.3	32.8	0.2	.
1979/80	2.9	10.1	42.1	34.2	6.9
1980/81	1.3	20.5	51.6	21.2	.
1981/82	11.5	3.1	51.7	14.6	17.6
1982/83	10.8	48.7	21.2	16.3	2.6
1983/84	10.0	39.6	29.0	21.4	.

1984/85	6.7	30.6	42.9	12.9	.

Country = IRAN

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	.	.	.
1970/71	.	44.9	55.1	.	.
1971/72	0.2	58.3	39.3	.	.
1972/73	.	83.4	.	.	.
1973/74	.	100.0	.	.	.
1974/75	2.6	78.3	19.1	.	.
1975/76	4.8	55.4	39.9	.	.
1976/77	3.4	96.6	.	.	.
1977/78	.	86.1	.	.	.
1978/79	0.4	92.1	.	.	0.1
1979/80	4.4	19.0	61.2	3.6	7.5
1980/81	17.7	21.4	37.0	8.6	.
1981/82	4.8	52.9	37.0	5.3	.
1982/83	.	.	43.3	3.2	25.7
1983/84	0.7	.	35.5	12.1	41.2
1984/85	5.4	.	65.8	0.9	21.4

Country = BANGLADESH

Year	EC	US	Australia	Canada	Argentina
1969/70	.	.	.	.	.
1970/71	.	.	.	.	.
1971/72	0.3	32.5	1.3	7.7	.
1972/73	9.1	43.0	3.1	12.9	32.0
1973/74	14.3	42.5	16.1	19.9	4.3
1974/75	29.8	37.2	14.1	15.7	0.8
1975/76	23.2	53.3	8.3	15.2	.
1976/77	28.6	46.7	13.5	11.2	.
1977/78	20.4	41.5	12.4	25.1	.
1978/79	16.1	45.2	4.3	29.9	.
1979/80	29.0	31.9	16.5	20.6	.
1980/81	6.7	54.2	20.6	18.2	.
1981/82	25.8	48.1	10.6	15.4	.
1982/83	23.5	45.9	3.1	27.4	.
1983/84	12.6	27.1	31.3	27.6	.
1984/85	10.9	72.0	12.0	2.6	0.3

Country = INDONESIA

Year	EC	US	Australia	Canada	Argentina
1969/70	18.3	65.0	11.3	2.7	.
1970/71	12.9	65.6	11.2	5.4	4.4
1971/72	25.7	39.9	25.4	8.3	.
1972/73	10.9	70.8	10.7	7.0	.
1973/74	12.1	51.0	21.8	12.1	.
1974/75	6.6	11.8	72.1	9.0	.
1975/76	5.1	58.3	34.3	2.3	.
1976/77	.	36.0	50.1	13.9	.
1977/78	3.1	40.8	55.7	0.3	.
1978/79	1.2	56.9	41.8	.	.
1979/80	0.5	47.1	50.9	1.6	.
1980/81	0.5	56.9	42.5	.	.
1981/82	0.8	60.6	36.5	2.1	.
1982/83	11.9	52.2	24.0	10.2	1.7
1983/84	1.6	69.1	27.8	.	1.6

1984/85	1.1	44.1	35.5	14.1	5.2

Country = MALAYSIA

Year	EC	US	Australia	Canada	Argentina
1969/70	11.2	2.3	82.1	4.0	.
1970/71	.	3.8	92.6	2.7	.
1971/72	.	.	94.8	4.3	.
1972/73	0.3	3.1	90.6	5.0	.
1973/74	0.9	4.8	86.6	4.8	.
1974/75	0.7	.	97.6	.	.
1975/76	.	.	97.6	.	.
1976/77	.	4.0	92.3	1.6	.
1977/78	.	13.4	85.9	0.7	.
1978/79	.	12.7	83.2	4.1	.
1979/80	.	10.0	90.0	.	.
1980/81	.	15.8	80.4	3.8	.
1981/82	.	24.4	75.4	.	.
1982/83	3.0	25.0	70.9	1.1	.
1983/84	.	21.5	78.5	.	.
1984/85	.	13.0	62.5	13.0	11.5

Source: World Wheat Statistics, Various Years, London.

Table 2.13. Exports of Wheat to Major Australia Destinations with Comparison to US HRW and White (000 MT)

Country = USSR

Year	Australia	US Total	US HRW	US White
1969/70	.	.	.	.
1970/71	.	.	.	.
1971/72	502	.	.	.
1972/73	908	9,468	8,441	439
1973/74	17	2,725	2,722	.
1974/75	656	978	980	.
1975/76	1,328	3,966	3,859	.
1976/77	368	2,869	2,639	.
1977/78	255	3,274	3,387	.
1978/79	136	2,967	2,559	.
1979/80	2,465	3,000	4,094	.
1980/81	2,741	3,920	2,881	.
1981/82	2,348	6,876	6,285	.
1982/83	1,004	3,036	3,295	.
1983/84	1,535	4,357	4,048	.
1984/85	2,040	6,123	6,298	.

Country = CHINA

Year	Australia	US Total	US HRW	US White
1969/70	2,446	.	.	.
1970/71	1,310	.	.	.
1971/72	.	.	.	.
1972/73	324	591	36	313
1973/74	1,239	3,190	2,134	86
1974/75	1,244	1,496	210	.
1975/76	1,126	.	.	.
1976/77	750	.	.	.
1977/78	4,603	225	.	.
1978/79	1,382	2,610	1,548	.
1979/80	3,575	1,929	410	453
1980/81	1,397	8,662	1,719	792
1981/82	1,413	8,054	143	.
1982/83	1,170	4,186	386	.
1983/84	1,660	3,131	1,289	.
1984/85	1,426	2,455	105	.

Country = EGYPT

Year	Australia	US Total	US HRW	US White
1969/70	.	14	.	.
1970/71	1,275	16	.	.
1971/72	1,801	5	.	.
1972/73	729	283	283	.
1973/74	736	798	683	16
1974/75	848	750	134	83
1975/76	1,025	1,225	.	35
1976/77	1,034	2,059	26	58
1977/78	1,246	1,902	133	29
1978/79	1,253	1,967	846	.
1979/80	1,846	2,531	375	192

1980/81	1,689	1,808	39	1,248
1981/82	1,587	3,020	5	2,306
1982/83	1,819	3,120	.	1,406
1983/84	1,704	2,767	.	816
1984/85	2,208	2,453	.	1,246

Country = JAPAN

		US		
Year	Australia	Total	HRW	White
1969/70	980	2,382	1,053	799
1970/71	821	2,878	1,227	880
1971/72	1,466	2,195	1,136	569
1972/73	717	3,377	1,329	1,259
1973/74	472	3,067	1,331	1,174
1974/75	963	3,079	1,287	1,003
1975/76	1,052	334	1,526	1,077
1976/77	1,076	3,280	1,338	1,128
1977/78	1,158	3,180	1,241	1,197
1978/79	1,161	3,187	1,449	1,077
1979/80	1,068	3,204	1,213	1,085
1980/81	914	3,525	1,371	1,228
1981/82	943	3,358	1,310	1,222
1982/83	934	3,294	1,274	1,107
1983/84	1,043	3,441	1,293	1,087
1984/85	1,039	3,324	1,290	966

Country = REP OF KOREA

		US		
Year	Australia	Total	HRW	White
1969/70	.	1,098	341	586
1970/71	27	1,684	644	824
1971/72	361	1,754	702	925
1972/73	.	1,621	463	793
1973/74	2	158	548	717
1974/75	.	1,733	573	1,029
1975/76	.	1,476	500	910
1976/77	21	1,984	732	1,205
1977/78	21	1,717	564	1,145
1978/79	.	1,671	521	975
1979/80	.	1,791	589	1,098
1980/81	.	2,055	607	1,299
1981/82	25	1,881	623	1,011
1982/83	.	1,750	645	1,045
1983/84	418	1,986	642	1,146
1984/85	973	2,070	644	1,122

Country = IRAQ

		US		
Year	Australia	Total	HRW	White
1969/70	55	.	.	.
1970/71	436	8	.	.
1971/72	192	.	8	.
1972/73	.	.	.	.
1973/74	116	459	90	.
1974/75	255	.	342	105
1975/76	340	107	71	.
1976/77	329	58	86	.

1977/78	537	532	355	1
1978/79	481	488	276	41
1979/80	575	138	435	.
1980/81	1,187	472	.	.
1981/82	816	49	.	.
1982/83	403	925	571	.
1983/84	859	1,171	1,140	.
1984/85	1,216	868	852	.

Country = IRAN

		US		
Year	Australia	Total	HRW	White
1969/70	.	.	.	.
1970/71	295	240	140	98
1971/72	397	588	151	424
1972/73	.	503	195	323
1973/74	.	584	250	302
1974/75	424	1,735	562	1,030
1975/76	108	150	169	95
1976/77	.	1,207	.	892
1977/78	.	1,100	34	1,082
1978/79	.	977	.	1,001
1979/80	718	223	.	240
1980/81	701	405	.	286
1981/82	510	728	.	311
1982/83	848	.	.	.
1983/84	1,291	.	.	.
1984/85	1,740	.	.	.

Country = BANGLADESH

		US		
Year	Australia	Total	HRW	White
1969/70	.	.	.	.
1970/71	.	.	.	.
1971/72	14	362	113	177
1972/73	53	745	100	34
1973/74	277	730	533	86
1974/75	299	790	202	148
1975/76	83	533	19	51
1976/77	109	376	26	43
1977/78	147	491	265	13
1978/79	52	552	224	19
1979/80	109	210	121	935
1980/81	448	1,178	15	441
1981/82	123	560	36	38
1982/83	49	718	58	27
1983/84	510	443	.	363
1984/85	262	1,576	.	984

Country = INDONESIA

		US		
Year	Australia	Total	HRW	White
1969/70	74	426	.	.
1970/71	71	416	14	.
1971/72	116	182	10	70
1972/73	75	495	.	223
1973/74	135	315	137	144

1974/75	598	98	5	.
1975/76	316	537	204	133
1976/77	543	390	.	156
1977/78	569	417	97	45
1978/79	518	705	209	55
1979/80	772	715	185	95
1980/81	551	737	398	309
1981/82	558	927	211	273
1982/83	368	801	482	.
1983/84	440	1,094	146	394
1984/85	502	625	228	179

Country = MALAYSIA

		US		
Year	Australia	Total	HRW	White
1969/70	492	14	.	.
1970/71	590	24	.	.
1971/72	210	.	.	.
1972/73	346	12	7	2
1973/74	291	16	22	34
1974/75	289	.	.	4
1975/76	323	.	15	4
1976/77	393	17	13	.
1977/78	377	59	12	6
1978/79	406	62	3	60
1979/80	371	41	3	94
1980/81	403	79	5	97
1981/82	407	132	51	10
1982/83	329	116	21	15
1983/84	428	117	9	30
1984/85	347	72	.	46

Source: World Wheat Statistics, various years, London.

Table 2.14. Market Share of Wheat to Major Australia Destinations with Comparison to US HRW and White

Country = USSR

		US		
Year	Australia	Total	HRW	White
1969/70	.	.	.	.
1970/71	.	.	.	.
1971/72	14.7	.	.	.
1972/73	5.7	59.6	53.1	2.8
1973/74	0.4	62.1	62.0	.
1974/75	23.2	34.6	34.7	.
1975/76	13.1	39.1	38.0	.
1976/77	8.1	62.9	57.9	.
1977/78	4.0	51.6	53.4	.
1978/79	2.7	59.1	50.9	.
1979/80	16.5	20.1	27.5	.
1980/81	23.5	33.5	24.6	.
1981/82	12.0	35.0	32.0	.
1982/83	5.0	15.1	16.4	.
1983/84	7.5	21.2	19.7	.
1984/85	7.2	21.7	22.4	.

Country = CHINA

		US		
Year	Australia	Total	HRW	White
1969/70	48.5	.	.	.
1970/71	35.8	.	.	.
1971/72	.	.	.	.
1972/73	6.1	11.2	0.7	5.9
1973/74	21.2	54.7	36.6	1.5
1974/75	22.6	27.2	3.8	.
1975/76	48.3	.	.	.
1976/77	23.8	.	.	.
1977/78	54.0	2.6	.	.
1978/79	17.2	32.4	19.2	.
1979/80	41.1	22.2	4.7	5.2
1980/81	10.1	62.9	12.5	5.7
1981/82	10.7	60.9	1.1	.
1982/83	9.0	32.4	3.0	.
1983/84	17.0	32.0	13.2	.
1984/85	19.2	33.0	1.4	.

Country = EGYPT

		US		
Year	Australia	Total	HRW	White
1969/70	.	0.6	.	.
1970/71	42.3	0.5	.	.
1971/72	66.8	0.2	.	.
1972/73	23.9	9.3	9.3	.
1973/74	23.1	25.0	21.4	0.5
1974/75	25.0	22.1	4.0	2.4
1975/76	27.3	32.6	.	0.9
1976/77	25.2	50.1	0.6	1.4
1977/78	26.9	41.0	2.9	0.5
1978/79	22.6	35.5	15.3	.
1979/80	27.3	37.5	5.6	2.8

1980/81	32.8	35.1	0.8	24.2
1981/82	26.4	50.2	0.1	38.4
1982/83	29.4	50.4	.	22.7
1983/84	23.2	37.7	.	11.1
1984/85	32.4	36.0	.	18.3

Country = JAPAN

		US		
Year	Australia	Total	HRW	White
1969/70	21.9	53.3	23.6	17.9
1970/71	17.4	60.9	25.9	18.6
1971/72	29.0	43.5	22.5	11.3
1972/73	12.9	60.7	23.9	22.6
1973/74	9.0	58.2	25.3	22.3
1974/75	18.3	58.5	24.5	19.1
1975/76	17.5	5.6	25.4	18.0
1976/77	19.0	57.8	23.6	19.9
1977/78	20.4	55.9	21.8	21.0
1978/79	20.8	57.1	25.9	19.3
1979/80	19.2	57.6	21.8	19.5
1980/81	15.4	59.4	23.1	20.7
1981/82	16.7	59.6	23.2	21.7
1982/83	16.7	58.9	22.8	19.8
1983/84	17.7	58.3	21.9	18.4
1984/85	18.1	57.8	22.4	16.8

Country = REP OF KOREA

		US		
Year	Australia	Total	HRW	White
1969/70	.	96.2	29.9	51.4
1970/71	1.6	98.4	37.7	48.1
1971/72	17.0	82.6	33.1	43.6
1972/73	.	99.3	28.3	48.6
1973/74	0.1	99.9	34.3	44.9
1974/75	.	100.0	33.1	59.4
1975/76	.	98.7	33.5	60.8
1976/77	1.0	96.0	35.4	58.3
1977/78	1.2	96.1	31.6	64.1
1978/79	.	98.2	30.6	57.3
1979/80	.	99.8	32.8	61.2
1980/81	.	99.2	29.3	62.7
1981/82	1.3	98.6	32.7	53.0
1982/83	.	97.0	35.8	57.9
1983/84	16.7	79.1	25.6	45.7
1984/85	32.0	68.0	21.2	36.9

Country = IRAQ

		US		
Year	Australia	Total	HRW	White
1969/70	64.7	.	.	.
1970/71	52.7	1.0	.	.
1971/72	64.4	.	2.5	.
1972/73	.	.	.	.
1973/74	20.1	79.7	15.6	.
1974/75	58.1	.	78.0	23.9
1975/76	58.6	18.4	12.3	.
1976/77	54.6	6.0	8.8	.

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1977/78              31.9         31.6          21.1          0.0
1978/79              32.8         33.3          18.8          2.8
1979/80              42.1         10.1          31.9           .
1980/81              51.6         20.5            .            .
1981/82              51.7          3.1            .            .
1982/83              21.2         48.7          30.1           .
1983/84              29.0         39.6          38.5           .
1984/85              42.9         30.6          30.0           .

                          Country = IRAN
-----------------------------------------------------------------
                             -------------- US -------------
Year               Australia    Total         HRW          White
1969/70                .          .            .             .
1970/71              55.1        44.9         26.2          18.4
1971/72              39.3        58.3         14.9          42.0
1972/73                .         83.4         32.4          53.6
1973/74                .        100.0         42.8          51.8
1974/75              19.1        78.3         25.3          46.5
1975/76              39.9        55.4         62.5          35.0
1976/77                .         96.6           .           71.4
1977/78                .         86.1          2.6          84.6
1978/79                .         92.1           .           94.3
1979/80              61.2        19.0           .           20.4
1980/81              37.0        21.4           .           15.1
1981/82              37.0        52.9           .           22.6
1982/83              43.3          .            .             .
1983/84              35.5          .            .             .
1984/85              65.8          .            .             .

                          Country = BANGLADESH
-----------------------------------------------------------------
                             -------------- US -------------
Year               Australia    Total         HRW          White
1969/70                .          .            .             .
1970/71                .          .            .             .
1971/72               1.3        32.5         10.2          15.9
1972/73               3.1        43.0          5.8           1.9
1973/74              16.1        42.5         31.1           5.0
1974/75              14.1        37.2          9.5           7.0
1975/76               8.3        53.3          1.9           5.1
1976/77              13.5        46.7          3.3           5.3
1977/78              12.4        41.5         22.4           1.1
1978/79               4.3        45.2         18.4           1.6
1979/80              16.5        31.9         18.3         141.9
1980/81              20.6        54.2          0.7          20.3
1981/82              10.6        48.1          3.1           3.2
1982/83               3.1        45.9          3.7           1.7
1983/84              31.3        27.1           .           22.2
1984/85              12.0        72.0           .           45.0

                          Country = INDONESIA
-----------------------------------------------------------------
                             -------------- US -------------
Year               Australia    Total         HRW          White
1969/70              11.3        65.0           .             .
1970/71              11.2        65.6          2.3            .
1971/72              25.4        39.9          2.1          15.3
1972/73              10.7        70.8           .           31.9
1973/74              21.8        51.0         22.1          23.3
```

1974/75	72.1	11.8	0.6	.
1975/76	34.3	58.3	22.1	14.4
1976/77	50.1	46.0	.	14.4
1977/78	55.7	40.8	9.5	4.4
1978/79	41.8	56.9	16.9	4.4
1979/80	50.9	47.1	12.2	6.3
1980/81	42.5	56.9	30.8	23.8
1981/82	36.5	60.6	13.8	17.9
1982/83	24.0	52.2	31.4	.
1983/84	27.8	69.1	9.2	24.9
1984/85	35.5	44.1	16.1	12.6

Country = MALAYSIA

		US		
Year	Australia	Total	HRW	White
1969/70	82.1	2.3	.	.
1970/71	92.6	3.8	.	.
1971/72	94.8	.	.	.
1972/73	90.6	3.1	1.9	0.4
1973/74	86.6	4.8	6.6	10.1
1974/75	97.6	.	.	1.4
1975/76	97.6	.	4.6	1.3
1976/77	92.3	4.0	3.0	.
1977/78	85.9	13.4	2.7	1.4
1978/79	83.2	12.7	0.7	12.3
1979/80	90.0	10.0	0.7	22.8
1980/81	80.4	15.8	1.0	19.4
1981/82	75.4	24.4	9.4	1.8
1982/83	70.9	25.0	4.6	3.3
1983/84	78.5	21.5	1.7	5.6
1984/85	62.5	13.0	.	8.2

Source: World Wheat Statistics, Various Years, London.

Table 2.15. Market Share of Australian Wheat Exports by Class.

Year	Prime Hard	Hard	Standard White	General Purpose
1976/77	9.8	12.4	68.7	9.2
1977/78	14.8	12.8	70.0	2.4
1978/79	3.9	10.7	79.1	6.2
1979/80	4.3	11.8	79.7	4.2
1980/81	4.3	9.6	84.0	2.1
1981/82	7.8	18.2	73.2	0.8
1982/83	10.6	13.5	73.0	2.8
1983/84	4.8	14.6	62.4	18.2
1984/85	6.0	10.5	65.9	17.6
1985/86	4.7	9.8	77.1	8.3

Source: Australian Wheat Board.

Table 2.16. Market Share of Australian Wheat Exports by Class and State.

Year	New South Wales	Victoria	South Australia	Western Australia	Queensland
Australian Prime Hard					
1976/77	99.2	.	.	.	0.8
1977/78	78.1	.	.	.	21.9
1978/79	83.0	.	.	.	17.0
1979/80	71.3	.	.	.	28.7
1980/81	72.7	.	.	.	27.3
1981/82	43.7	.	.	.	56.3
1982/83	38.1	.	.	.	61.9
1983/84	48.9	.	.	.	51.3
1984/85	80.5	.	.	.	19.5
1985/86	72.0	.	.	.	28.0
Australian Hard					
1976/77	61.1	.	20.9	0.3	17.7
1977/78	81.1	3.1	10.3	4.3	1.1
1978/79	32.2	.	18.2	14.8	34.8
1979/80	70.8	2.8	16.4	3.8	6.2
1980/81	29.7	.	35.5	33.8	1.0
1981/82	57.8	1.7	19.8	17.3	3.4
1982/83	31.6	0.1	22.6	38.1	7.5
1983/84	52.1	.	14.6	10.2	23.1
1984/85	32.1	2.6	25.6	8.8	30.8
1985/86	36.4	1.4	13.2	16.8	32.3
Australian Standard White					
1976/77	27.5	21.0	4.9	45.1	1.6
1977/78	17.5	25.7	5.8	49.3	1.7
1978/79	13.4	29.6	16.2	35.8	4.9
1979/80	18.5	32.3	16.4	30.6	2.2
1980/81	23.2	30.6	13.8	32.1	0.2
1981/82	16.5	28.4	11.6	42.0	1.4
1982/83	4.3	3.9	4.6	86.2	1.0
1983/84	14.0	28.5	20.4	33.3	3.8
1984/85	17.0	25.2	13.4	40.8	3.5
1985/86	22.0	21.4	11.4	39.1	6.1
Australian General Purpose					
1976/77	31.8	31.5	1.7	15.3	19.7
1977/78	24.0	7.8	2.6	64.6	1.0
1978/79	39.9	.	.	14.3	45.8
1979/80	23.4	.	5.4	16.2	55.0
1980/81	3.6	4.6	.	91.8	.
1981/82	14.1	1.2	.	22.4	62.4
1982/83	.	.	.	65.8	34.2
1983/84	30.9	12.2	1.8	46.9	8.2
1984/85	63.7	19.4	.	12.3	4.6
1985/86	70.5	20.7	3.8	0.4	4.5

Source: Australian Wheat Board.

Table 2.17. Yield by Major Exporters (MT/ha)

Year	France	Canada	US	Argentina	Australia
1962	3.1	1.4	1.7	1.7	1.3
1963	2.7	1.8	1.7	1.6	1.3
1964	3.1	1.4	1.7	1.8	1.4
1965	3.3	1.5	1.8	1.3	1.0
1966	2.8	1.9	1.8	1.2	1.5
1967	3.6	1.3	1.7	1.3	0.8
1968	3.7	1.5	1.9	1.0	1.4
1969	3.6	1.8	2.1	1.3	1.1
1970	3.4	1.8	2.1	1.3	1.2
1971	3.9	1.8	2.3	1.3	1.2
1972	4.6	1.7	2.2	1.6	0.9
1973	4.5	1.7	2.1	1.7	1.3
1974	4.6	1.5	1.8	1.4	1.4
1975	3.9	1.8	2.1	1.6	1.4
1976	3.8	2.1	2.0	1.7	1.3
1977	4.2	2.0	2.1	1.4	0.9
1978	5.0	2.0	2.1	1.7	1.8
1979	4.8	1.6	2.3	1.7	1.4
1980	5.2	1.7	2.3	1.5	1.0
1981	4.8	2.0	2.3	1.4	1.4
1982	5.2	2.1	2.4	2.0	0.8
1983	5.1	1.9	2.6	1.8	1.7
1984	6.4	1.6	2.6	2.3	1.5
1985	6.0	1.7	2.5	1.6	1.4
1986	5.5	2.2	2.3	1.8	1.5
1987	.	1.8	2.6	1.9	1.4

Source: World Wheat Statistics, various years, London.
1986 and 1987 from FAS (FG-9-97).

Table 2.18 Yield by Australia and US Total and Classes
(in Tons per Hectares)

		US		
Year	Australia	Total	HRW	White
1978	1.8	2.1	2.0	3.1
1979	1.4	2.3	2.3	3.1
1980	1.0	2.3	2.2	3.6
1981	1.4	2.3	2.0	3.9
1982	0.8	2.4	2.3	3.5
1983	1.7	2.6	2.7	4.1
1984	1.5	2.6	2.5	3.8
1985	1.4	2.5	2.4	3.5
1986	1.5	2.3	2.2	3.5
1987	1.4	2.6	2.5	.

Source: World Wheat Statistics, various years, London.
Wheat Situation and Outlook Report, ERS, WS-278, May 1987

TABLE 2.19 GROWTH RATES IN YIELDS FOR MAJOR EXPORTERS

	γ	β	R^2	Growth Rate %/Year
France	1.45 (88.46)	0.0133* (11.60)	.86	1.32
Canada	1.18* (56.24)	0.0043* (2.90)	.28	0.42
U.S.	1.22* (109.28)	0.0075* (9.54)	.81	0.75
Argentina	1.11* (37.05)	0.0055* (2.60)	.23	0.55
Australia	1.07* (25.97)	0.0019 (0.65)	.02	0.19
World	1.07* (131.56)	0.01146* (20.15)	.95	1.14

NOTE: Figures in ( ) are t-ratios and * indicates significantly different from zero at the 10 percent level.

TABLE 2.20. PERCENTAGE OF RECEIVALS BY CLASS

Years	Australia Prime Hard (APH)	Australia Hard (HH)	Australia Standard White[1] (ASW)	General Purpose[2] (GP)
1976/77	8.7	18.4	64.5	8.4
1977/78	14.2	17.2	62.8	5.8
1978/79	4.3	15.6	69.2	10.9
1979/80	4.7	16.1	74.3	4.9
1980/81	3.8	14.5	77.6	4.1
1981/82	7.7	19.9	68.1	4.3
1982/83	10.1	13.8	72.3	3.8
1983/84	6.6	12.4	51.5	29.5
1984/85	6.4	13.0	77.5	3.1
1985/86	4.5	13.0	64.7	17.8
Ten Year Averages				
Australia	7.1	15.4	68.3	9.2
New South Wales	15.9	25.7	45.2	13.2
Victoria	--	3.6	90.7	5.7
South Australia	--	24.1	72.7	3.2
Western Australia	--	5.1	87.3	7.6
Queensland	28.6	29.9	26.0	15.5
Tasmania	--	--	--	--

[1] Includes minor quantities of durum and soft wheat.
[2] Includes Australian feed wheat.

SOURCE: Australian Wheat Board Annual Reports.

TABLE 2.21. AUSTRALIAN WHEAT SAMPLES 1986-87, CROP ANALYTICAL DATA

State	Australian Prime Hard			Australian Hard No. 1			
	Queensland	New South Wales PH 14%	New South Wales PH 13%	Queensland	New South Wales	South Australia	Western Australia
WHEAT							
Test weight (kg/hl)	81.1	79.0	80.5	81.8	80.8	80.5	81.2
Grain hardness (P.S.I.)	14	13	13	14	13	13	14
Protein, % (11% moisture basis)	14.8	14.9	13.8	12.7	12.6	12.8	12.6
Falling number (sec.)	430	463	434	435	433	440	470
Flour extraction(%)	75	75	75	75	75	73	73
SCREENINGS (%)							
Foreign material	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Total screenings	4.3	4.5	3.8	2.9	4.4	3.3	2.3
FLOUR							
Protein (%)	13.7	14.0	12.8	11.4	11.5	11.4	11.0
Wet gluten (%)	36	39	36	31	30	33	31
FARINOGRAM							
Water absorption (%)	64.6	64.4	63.2	62.6		62.9	65.8

	Australian Standard White				
	Queensland	New South Wales	Victoria	South Australia	Western Australia
WHEAT					
Test weight (kg/hl)	82.7	80.9	80.2	81.5	82.5
Grain hardness (P.S.I.)	15	18	18	14	17
Protein, % (11% moisture basis)	10.6	10.1	9.7	10.4	9.5
Falling number (sec.)	420	420	390	430	420
Flour extraction(%)	75	73	74	73	73
SCREENINGS (%)					
Foreign material	0.3	0.2	0.2	0.2	0.2
Total screenings	3.5	3.6	2.8	3.3	2.7
FLOUR					
Protein (%)	9.4	8.9	8.5	9.2	8.5
Wet gluten (%)	27	25	23	25	21
FARINOGRAM					
Water absorption (%)	60.5	58.1	56.9	61.4	61.5

SOURCE: Australian Wheat Board.

TABLE 2.22. TYPICAL ANALYSIS FOR THE AUSTRALIAN MILLING WHEAT CLASSES

	Australian Prime Hard 14%	Australian Hard	Australian Standard White	Australian Soft
WHEAT				
Test weight (kg/hl)	79.4	80.0	80.5	78.0
1000 kernel weight (g)	35.2	37.2	35.2	34.8
Grain hardness (P.S.I)	15	14	17	27
Protein % (11% moisture)	14.2	12.2	10.8	8.5
Ash %	1.50	1.50	1.38	1.38
Falling number (sec)	494	460	422	325
Flour extraction %	75	74	75	74
SCREENINGS				
Total screenings % (2 mm screen)	2.5	2.6	3.1	3.2
FLOUR	13.1	11.0	9.6	7.5
Protein % (13.5% moisture)	40.0	33.7	28.8	2.2
Wet gluten %	192	237	195	116
Diastatic activity (mg)	0.50	0.48	0.47	0.45
Ash %				
FARINOGRAM				
Water absorption %	65.6	65.8	60.8	52.4
Development time (min)	6.0	4.7	3.4	1.9
EXTENSOGRAPH				
Extensibility (cm)	23.2	22.8	20.1	19.6
Maximum height (B.U.)	460	365	320	190
Area (cm^2)	140	112	95	43

SOURCE: Australian Wheat Board, Australian Wheat Industry Guide.

TABLE 2.23. SELECTED U.S. WHEAT CROP QUALITY DATA

	Hard Red Winter (3-year composite averages)	Western White Wheat (85 and 86 average
Test wt. (kg/hl)	77.5	76.2
Protein (11% moisture)[2]	12.2	10.3
Falling number	388	400
Flow Yield	71.8	71.7
Total defects	2.6[1]	1.4
Dockage	.9[1]	.8
Farigraph -		
Winter absorption	62.0	54.3

[1] 1986 only.

[2] Concentrated to 11 percent moisture basis.

SOURCE: U.S. Wheat, 1986 Crop Quality Report.

TABLE 2.24 AVERAGE QUALITY BY STATE AND CLASS, 1970/71 - 86/87

	Test Weight Kg/hl	Protein[1] %	Foreign Material %
		Australian Hard White	
New South Wales	76.5	11.2	.25
Queensland	81.4	11.3	.39
South Australia	77.0	11.1	.29
Victoria	78.6	10.4	.29
Western Australia	76.5	10.7	.52
		Australian Hard	
New South Wales	78.1	12.9	.28
Queensland	78.1	13.2	.39
South Australia	77.1	12.4	.31
Victoria	82.8	13.5	.20
Western Australia	77.7	12.1	.35
		Australian Prime Hard	
New South Wales	77.2	14.3	.20
Queensland	77.4	14.3	.28

[1] 11 percent moisture basis.

TABLE 2.25 REGRESSION OF PROTEIN LEVEL AND TREND[1], 1970/71 - 86/87

			R^2
Australian Standard White	10.89* (32.89)	-.0273 (.84)	.05
Australian Hard	12.71* (68.01)	+.0028 (.155)	.002
Australian Prime Hard	14.68* (56.95)	-.04 (1.64)	.15

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[1] Trend is T = 1,2, ... 7 for 1970/71, 1971/72, ... 1986/87.

TABLE 2.26. PROFILE OF NUMBER OF ESTABLISHMENTS BY AREA OF WHEAT SOWN NEW SOUTH WALES, 1973-86

Year	Area of Wheat Sown (Hectares)						Total Number of Establishments
	0-99	100-249	250-499	500-999	1000-1499	1500 and over	
1972-73	9307	6438	1946	464	66	39	18260
1973-74	8613	6447	2387	615	97	49	18208
1974-75	7608	5526	2252	669	83	41	16179
1975-76	8298	6147	2138	620	90	59	17352
1976-77	7834	5788	2668	876	151	70	17387
1977-78	7397	6548	2776	975	168	75	17838
1978-79	7450	5868	2476	905	206	71	16976
1979-80	6802	6293	2716	1074	192	87	17164
1980-81	6321	5825	2635	1056	209	99	16145
1981-82	6087	5677	2718	1218	258	143	16096
1982-83	5992	5477	2439	967	214	121	15210
1983-84	5708	5430	3104	1350	331	200	16123
1984-85	5647	5417	2656	1209	276	175	15380
1985-86	5385	5198	2675	1224	297	209	14988

SOURCE: New South Wales Farmers, Address presented by D. Wilkinson, November 17, 1987.

TABLE 2.27. FARM PROFILE OF PRODUCERS IN THE WHEAT-SHEEP ZONE

	Unit	1984-85	1985-86
ITEM			
Total farm area[a]	ha	1,804	1,934
Wheat sown	ha	227	216
Sheep carried[a]	no.	1,696	1,725
Beef cattle carried[a]	no.	134	142
Area harvested			
wheat	ha	224	209
other grains	ha	91	86
Wheat harvested	t	359	309
Sheep sold	no.	576	577
CASH RECEIPTS			
Sales			
Sheep	$	10,717	8,950
Beef cattle	$	15,634	15,680
Other livestock	$	1,277	930
Wool	$	23,726	25,130
Wheat	$	42,031	36,200
Other crops	$	20,903	18,010
Total cash receipts	$	120,712	110,860
Farm cash operating surplus	$	31,889	22,740
Components of investment eturns			
Total cash receipts	$	120,712	110,860
Total cash costs	$	88,822	88,120
Farm cash operating surplus	$	31,889	22,740
Buildup in trading stocks	$	4,191	3,850
Depreciation	$	20,245	21,080
Operator and family labor	$	19,472	18,870
Return to capital & management	$	-3,637	-13,360
Return adjusted to full equity	$	7,875	1,730
Capital appreciation	$	9,175	-67,120
Full equity return, incl. capital appreciation	$	17,050	-65,400
Rate of return, excl. capital appreciation	%	1.0	0.2
Rate of return, inc. capital appreciation	%	2.3	-8.8
Real rate of return, inc. capital appreciation	%	-2.0	-17.2
OTHER FINANCIAL ITEMS			
Farm capital at 30 June	$	764,939	679,070

SOURCE: Farm Survey Report (March 1987), Bureau of Agricultural Economics.

TABLE 2.28. SUPERPHOSPHATE USED ON WHEAT

Year	Superphosphate on Wheat	Crop Area Fertilized
	(Quintals Used) KE	000 Ha Crops
1978/79	634	12,945
1979/80	716	--
1980/81	756	--
1981/82	801	14,432
1982/83	770	--
1983/84	720	--
1984/85	618	15,721
1985/86P	499	14,416
1986/87		

SOURCE: Quarterly Review of Agricultural Economics, Various Issues.

P = preliminary.

APPENDIX B

WHEAT QUALITY STANDARDS

1984/85 - 1987/88

Wheat Quality Standards and Dockage Rates for 1984-1985 Season

WHEAT QUALITY STANDARDS

GENERAL:

SOUNDNESS AND MATURITY [illegible] **special arrangement** [illegible]

RED WHEATS [illegible]

DURUM WHEATS [illegible]

TEST WEIGHT [illegible]

MOISTURE LIMIT Not more than 12%

DOCKAGE RATES FOR GENERAL PURPOSE:

[illegible]

HOW TO USE THE CALCULATION TABLE —

A [illegible]
B [illegible]
C [illegible]

NOTE 1 Dockages are cumulative unless stated otherwise
2 [illegible]

	AUSTRALIAN STANDARD WHITE		GENERAL PURPOSE				FEED WHEAT
CATEGORY	DETAILS	TOLERANCE	DOCKAGE DETAILS	74 kg hl & over	71-73½ kg hl	68-70½ kg hl	ABOVE 62 kg hl
1	CHONDROMETER WEIGHT	[illegible]		NIL	$1	$[illegible]	No Dockage
2	MOISTURE	[illegible]					
3	UNMILLABLE MATERIAL [illegible]						UNLIMITED
	[illegible]	Not more than [illegible] By Volume	[illegible]	$[illegible]	$[illegible]	$[illegible]	No Dockage
	[illegible]	Not more than [illegible] By Volume	[illegible]	[illegible]	[illegible]	[illegible]	No Dockage
	[illegible]	Not more than [illegible] By Volume [illegible]	[illegible]	[illegible] STA	[illegible] STA	[illegible] STA	No Dockage
4	WEED SEEDS & OTHER FOREIGN SEEDS [illegible]	Not more than [illegible]	[illegible]	$1 $[illegible] $[illegible] STA	$1 $[illegible] $[illegible] STA	$1 $[illegible] $[illegible] STA	No Dockage No Dockage No Dockage STA
	[illegible]	Not more than [illegible]	[illegible]	$1 $[illegible] STA	$1 $[illegible] STA	$1 $[illegible] STA	No Dockage No Dockage STA
	[illegible]	Not more than [illegible]	[illegible]	$1 $[illegible] STA	$1 $[illegible] STA	$1 $[illegible] STA	No Dockage No Dockage STA
	[illegible]	Not more than [illegible]	Not applicable	Not more than [illegible]	Not more than [illegible]	Not more than [illegible]	Not more than [illegible]
	[illegible]	NIL	Not applicable	NIL TOLERANCE	NIL TOLERANCE	NIL TOLERANCE	NIL TOLERANCE
5	ERGOT OF WHEAT OR RYE GRASS	Not more than [illegible]	[illegible]	$1 $[illegible] STA	$1 $[illegible] STA	$1 $[illegible] STA	No Dockage No Dockage STA
6	SPROUTED GRAIN [illegible]	There is a NIL TOLERANCE for SPROUTED GRAIN in Australian Standard White and General Purpose categories					UNLIMITED
7	WEATHER STAINED BLACK POINT OR FUNGUS AFFECTED PINK GRAINS	Not more than [illegible] By Count	[illegible]	$[illegible] STA	$[illegible] STA	$[illegible] STA	No Dockage
8	DRY GREEN OR SAPPY GREEN GRAINS	Not more than [illegible] By Count	[illegible]	$[illegible] STA	$[illegible] STA	$[illegible] STA	No Dockage
9	OTHER OBJECTIONABLE FOREIGN MATTER [illegible]	NIL	[illegible]				
			MAXIMUM TOTAL [illegible]	$15	$15	$15	Not Applicable

MAXIMUM OF $10 CAT. 3

UNLESS WITH THE APPROVAL OF THE STATE MANAGER GP WHEAT MUST NOT BE BINNED WITH ASW WHEAT, AND STA WHEAT MUST NOT BE BINNED WITH GP

S T A Means [illegible]

G V DUNN
MANAGING DIRECTOR
OCTOBER 1984

The above Quality Standards and Dockage Rates have been determined by the Australian Wheat Board for the 1984-85 season, the Standards apply to individual loads and must not be averaged over a number of loads.

Wheat Varieties Approved for Sowing in 1985

Lindsay Cook
Principal Agronomist (Cereals)
NSW Department of Agriculture Sydney

The Minister for Agriculture & Fisheries, Mr Jack Hallam has made two significant changes to the system of official variety recommendations to apply for the 1985 wheat season.

The major change is that the Minister's official list from now on will be called "approved varieties" rather than "recommended varieties". The reason for this is that calling them recommended has caused some confusion among farmers, as they expect that a recommended variety should be the best that they can grow. However there are up to 12 varieties approved for some silo groups, which do not all perform equally as well in all areas of the silo group, and they usually also cover a wide range of maturities. So farmers have generally looked to their district agronomist to recommend the best variety or varieties from within this official list of recommended varieties for their particular location and requirements. There has been some dissatisfaction and confusion over Departmental officers making "recommendations" from within the list of "recommended" varieties.

To avoid this situation it has been decided to call the Minister's official list of varieties "approved" and to leave the term "recommended" varieties for district agronomists or other advisers to apply to the local situation or for the individual farmer.

The second significant change is to no longer make specific mention of varieties suitable for irrigation. There has been a trend for irrigation farmers in the Murray and Murrumbidgee Valley to grow hard as well as soft varieties in recent years, and there has been a shortage of satisfactory soft varieties. In addition there has never been a special mention of varieties suitable for irrigation in the central and northern inland river valleys. The result of these two decisions is that there will be three categories of wheat varieties for 1985 sowings. They are "approved", "provisionally approved", and "approved but outclassed".

Growers should consult their district agronomist for more specific recommendations within those categories.

New lines released

Five new varieties were approved for release in 1985. They are:

- C117, a hybrid variety from the Cargill breeding programme, approved for receival as northern hard in silo groups 1, 2 and 3.
- SUN 69A, bred by Sydney University and approved for silo groups 1, 2 and 3 for receival as northern hard.
- SUN 64G also from Sydney University approved for southern hard and ASW for silo groups 3, 4, 5 and 6.
- M 2636, from the Department of Agriculture's breeding programme at Temora, approved for southern hard and ASW for silo groups 4, 5 and 6.
- WW 246, a soft variety from the Department's breeding programme at Wagga, approved for growing in silo group 5 and receival into the ASW grade.

It is expected that all of these lines will be named during the spring.

Changes

There were a number of other changes to the 1984 list of varieties.

- Durati has been deleted from list of approved durum varieties, as Kamilaroi is superior to it in both yield and quality.
- Songlen has been placed in the list of "approved but outclassed" varieties for silo groups 1 and 2 as it is now substantially inferior in yield to more recent varieties.
- Hybrid Titan has been deleted from the "approved" varieties in silo groups 1 and 2 as there is little or no seed available for sowing in 1985.
- Shortim has been deleted from the list of "approved but outclassed" varieties in silo group 3 on the basis of yield and its very low acceptance in that area.
- Hartog has been made "provisionally approved" for silo group 3 and there will be a strong extension campaign to encourage farmers to only grow it in situations where high protein levels are achieved.
- Sunstar has been added to the list of "approved" varieties for silo groups 4, 5 and 6.
- Bob's Kite and Olympic have been placed on the "approved but outclassed" list for silo group 6 on the basis of inferior yield.
- Sunca has been moved from "provisionally approved" to "approved" for silo group 3.

New lines rejected

The cross bred M2369 was considered by the Standing Advisory Committee on wheat and unanimously rejected on the basis of both inferior quality and susceptibility to stripe rust.

The Queensland variety King was also rejected by the Committee for release in New South Wales as it also is too susceptible to stripe rust.

Australian Durum Wheat No. 1 (New South Wales)

The Durum wheat class is restricted to approved durum varieties at nominated sites. The varieties for the 1984-85 season are:

Durat, Duramba, Durati, Kamilaroi

Deliveries must be at least equal to Australian Standard White wheat standards, except for the following:

1. Protein minimum: At least 12% on an 11% moisture basis.
2. Up to 2% sprouted grains (by count) provided that individual load samples have a falling number of not less than 300 seconds.
3. Weather stained, blackpoint or fungus affected pink grains: up to 5% (by count).
4. Dry green, sappy, discoloured or distorted grains: up to 1% (by count).
5. Bread wheats: up to 3% (by count).

Australian Durum Wheat No. 2 (New South Wales)

The Durum No. 2 wheat class is restricted to approved durum varieties (according to Durum wheat No. 1) at nominated sites. Deliveries must be at least equal to Australian Standard White wheat standards, except for the following:

1. Minimum test weight — 74 kg hl
2. Up to 40% mottled grains (by count)
3. Up to 5% sprouted grains (by count) provided that individual load samples have a falling number of not less than 200 seconds.
4. Weather stained, black point or fungus affected pink grains: up to 10% (by count)
5. Dry green, sappy, discoloured or distorted grains: up to 2% (by count)
6. Unmillable material: up to 7½% (by volume)
7. Bread wheats: up to 5% (by count)

OTHER GRADES

PRIME HARD

1 [illegible]
(a) **PROTEIN MINIMUM** [illegible]
(b) **SPROUTED GRAIN** [illegible]
2 **VARIETIES** [illegible]
NOTE [illegible]

NORTHERN HARD No. 1

1 [illegible]
(a) **PROTEIN MINIMUM** [illegible]
(b) **SPROUTED GRAIN** [illegible]
2 **VARIETIES** [illegible]
Silo Group [illegible]
Silo Group [illegible]
NOTE [illegible]

NORTHERN HARD No. 2

1 [illegible]
2 **SCREENINGS** [illegible]
3 **SPROUTED GRAIN** [illegible]
4 **WEATHER STAINED BLACK POINT OR FUNGUS AFFECTED PINK GRAINS** [illegible]
5 **DRY GREEN OR SAPPY GREEN GRAINS** [illegible]
6 **VARIETIES** As per Northern Hard No. 1

SOUTHERN HARD No. 1

1 [illegible]
(a) **PROTEIN MINIMUM** [illegible]
2 **VARIETIES** [illegible]
Silo Group [illegible]
Silo Group [illegible]
Silo Group [illegible]

SOFT BISCUIT WHEAT

1 [illegible]
2 [illegible]

FEED WHEAT

[illegible]

FEED WHEAT IS TO BE BINNED SEPARATELY FROM GP UNDER ALL CIRCUMSTANCES UNLESS WITH THE APPROVAL OF THE STATE MANAGER. STA WHEAT MUST NOT BE BINNED WITH FEED WHEAT

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NOTICE

GRAIN HANDLING AUTHORITY OF N.S.W.

THE QUALITY STANDARDS AND DOCKAGE RATES HAVE BEEN DETERMINED BY THE AUSTRALIAN WHEAT BOARD FOR THE 1985/86 SEASON. THE STANDARDS APPLY TO INDIVIDUAL LOADS AND MUST NOT BE AVERAGED OVER A NUMBER OF LOADS.

PAYMENT ENQUIRIES AND TOLL FREE NUMBER 008 112413

WHEAT QUALITY STANDARDS

GENERAL

SOUNDNESS AND MATURITY: Only sound, mature wheat is acceptable.
RED WHEATS: [illegible] for delivery and will be received into the **FEED WHEAT** category. [illegible] all other categories.
DURUM WHEATS: Dural, Duramba, Durati or Kamilaroi is to be received only at nominated stations. Acceptability will be determined by the [illegible]
TEST WEIGHT: For acceptance as ASW or a higher grade, wheat must weigh at least 74kg/hl. Wheat weighing less than 62kg/hl must not be received without special instruction.
MOISTURE LIMIT: Not more than 12%.

DOCKAGE RATES FOR

GENERAL PURPOSE: Any acceptable wheat which does not qualify for ASW or higher grade provided that the Chondrometer Weight is at least 68kg/hl. Dockages may only be applied on wheat received into the general purpose category. These are cumulative up to the maximum of $12 per tonne.
SPROUTED GRAIN: May contain up to 10 sprouted grains per ½ litre providing the falling number is at least 200 seconds.
HOW TO USE THE CALCULATION TABLE:
A. Refer to the Standards under ASW and find the defect applicable to the sample.
B. Follow that line across to the right and ensure that the correct line is selected under Dockage Details.
C. Go to that column to which the Chondrometer Weight refers and apply the dockage as shown.
NOTE
1. Dockages are cumulative for each category up to a maximum of $12 per tonne. (STA wheat is excluded from this category)

	AUSTRALIAN STANDARD WHITE		GENERAL PURPOSE				FEED WHEAT
CATEGORY	DETAILS	TOLERANCE	DOCKAGE DETAILS	74kg/hl & OVER	71-73½ Kg/hl	68-70½ Kg/hl	ABOVE 62 Kg/hl
1	CHONDROMETER WEIGHT	At least 74kg/hl		NIL	$3	$6	No Dockage
2	MOISTURE	Not more than 12%					
3	UNMILLABLE MATERIAL: material passing through a 2mm screen and/or [illegible]						UNLIMITED
a)	Wheatheads, chaff, stones, backbone, [illegible] and screenings	Not more than 7% By Volume (of which not more than 1% is small foreign seeds)	Over 7% to 15% Over 15% to 25% Over 25%	$3 $6 STA	$3 $6 STA	$3 $6 STA	No Dockage
b)	Small Foreign Seeds, that is any seed passing through a 2mm screen except those mentioned in any other category. Rape seed is classed as a small foreign seed	Not more than 1% By Volume	Over 1% to 3% Over 3% to 5% Over 5% to 10% Over 10%	$3 $6 $9 STA	$3 $6 $9 STA	$3 $6 $9 STA	No Dockage
4	WEED SEEDS & OTHER FOREIGN SEEDS						
a)	All other cereal grains and any oil seeds and weed seeds not specified in other categories. Black oats, seeds of [illegible], insect damaged wheat, "Small foreign seeds" [illegible] are excluded from this category	Not more than 50 in total per ½ litre	51-100 seeds 101-150 seeds 151-200 seeds Over 200 seeds	$3 $6 $9 STA	$3 $6 $9 STA	$3 $6 $9 STA	No Dockage No Dockage No Dockage STA
b)	Saffron thistle, variegated thistle, Mexican poppy, [illegible] is only acceptable if there is no detectable tainting when imparted to wheat	Not more than 5 in total per ½ litre	6-10 seeds 11-20 seeds 21-50 seeds Over 50 seeds	$3 $6 $9 STA	$3 $6 $9 STA	$3 $6 $9 STA	No Dockage No Dockage No Dockage STA
c)	Sunflower seed, maize, soybean, lupins, field peas, double gees & safflower, Spiny Burr (American Burr, St Barnaby)	Not more than 1 in total per ½ litre	2-10 seeds 11-20 seeds 21-50 seeds Over 50 seeds	$3 $6 $9 STA	$3 $6 $9 STA	$3 $6 $9 STA	No Dockage No Dockage No Dockage STA
d)	Thornapple (Datura spp.), Bathurst, Noogoora burr and cottonseed	Not more than 1 in total per ½ litre	Not applicable	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre
5	ERGOT OF WHEAT ERGOT OF RYE GRASS	Not more than 3 pieces in total per ½ litre	4-5 pieces 6-10 pieces Over 10 pieces	$3 $6 STA	$3 $6 STA	$3 $6 STA	No Dockage No Dockage STA
6	SPROUTED GRAIN Sprouted kernels are those in which the covering of the germ is split open, and any further advanced stage of growth to the extent of the germ having grown or shot	NIL	1 to 10 sprouted grains per ½ litre	$12 BUT FALLING NUMBER MUST BE AT LEAST 200 SECONDS	$12	$12	UNLIMITED
7	FUNGAL STAINED GRAINS includes blackpoint, black tip, pink grains and grains discoloured by field fungi	Not more than 10% By Count	Over 10% to 25% Over 25% to 50% Over 50%	$3 $6 STA	$3 $6 STA	$3 $6 STA	No Dockage
8	DRY GREEN OR SAPPY GREEN GRAINS, FROST AFFECTED, DISEASE OR DRYING OPERATIONS	Not more than 1% By Count	Over 1% to 10% Over 10% to 20% Over 20%	$3 $6 STA	$3 $6 STA	$3 $6 STA	No Dockage
9	OTHER OBJECTIONABLE FOREIGN MATTER [illegible]	NIL	[illegible]				
			MAXIMUM TOTAL DOCKAGE	$12	$12	$12	Not Applicable

STA Means "Subject to Assessment" by the State Manager of the Australian Wheat Board. Representative samples of STA wheat should be sent to the Head Office of the G.H.A. for his attention and the wheat must not be received pending advice as to classification and dockage. This includes assessment as to whether or not wheat is suitable for receival as Feed Category.

G V DOBBIN
MANAGING DIRECTOR
OCTOBER 1985

ALL GRADES MUST BE STORED SEPARATELY. IN DEPOTS AND BUNKERS EACH GRADE MUST BE KEPT AS A SEPARATE PARCEL. IF THIS IS NOT POSSIBLE THE APPROVAL OF THE REGIONAL MANAGER MUST BE OBTAINED BEFORE ANY ACTION IS TAKEN.

OTHER GRADES

PRIME HARD

1. At least equal to Australian Standard White specifications except for:
   a) **PROTEIN MINIMUM**: At least 12.8% protein on 11% moisture basis.
   b) **SPROUTED GRAIN**: May contain up to 2% sprouted grain (by count) provided individual load samples have a falling number of not less than 350 seconds.
2. **VARIETIES**: The only acceptable varieties are BANKS, COOK, GATCHER, HYBRID TITAN, SHORTIM, SUNGLEN, SUNECA, SUNKOTA, SUNSTAR, TIMGALEN, HARTOG*.

NOTE: 1. The PWA are responsible for the objective assessment of protein and falling numbers.

NORTHERN HARD NO. 1

1. At least equal to Australian Standard White specifications except for:
   a) **PROTEIN MINIMUM**: At least 11.5% protein on 11% moisture basis. At sites where protein testing is unavailable up to 25% mottled grains (by count) are permitted.
   b) **SPROUTED GRAIN**: May contain up to 2% sprouted grain (by count) provided individual load samples have a falling number of not less than 350 seconds.
2. **VARIETIES**: The only acceptable varieties are in:

SILO GROUP 1 & 2: BANKS, BASS, CONDOR, COOK, FLINDERS, GATCHER, HARRIER, HARTOG, HYBRID TITAN, KITE, OSPREY, SHORTIM, SKUA, SUNGLEN, [illegible], SUNECA, SUNELG, SUNKOTA, SUNSTAR, TAKARI, TERRA, TIMGALEN, TIMSON, VULCAN.

SILO GROUP 3: BANKS, BASS, CONDOR, COOK, EAGLE, FLINDERS, GATCHER, HARRIER, HYBRID TITAN, KITE, OSPREY, SHORTIM, SKUA, SUNGLEN, [illegible], SUNECA, SUNELG, SUNKOTA, SUNSTAR, TAKARI, TERRA, TIMGALEN, TIMSON, VULCAN, HARTOG*.

NOTE: **HARTOG*** will be acceptable into the PH/AH Wheat Classes at Silo Group 3 at receival sites where PH/AH is received and the sites have protein testing available.

AUSTRALIAN HARD NO. 2

1. At least equal to Australian Standard White specifications except for:
   a) **PROTEIN MINIMUM**: At least 11.5% protein on 11% moisture basis. At sites where protein testing is unavailable up to 25% mottled grains (by count) are permitted.
   b) **SCREENINGS**: Up to 7% (by volume).
   c) **SPROUTED GRAIN**: Up to 10% (by count). Station falling number must be at least 250 seconds.
   d) **WEATHER STAINED/BLACK POINT OR FUNGUS AFFECTED PINK GRAINS**: Up to 20% (by Count).
   e) **DRY GREEN, SAPPY, DISCOLOURED OR DISTORTED GRAINS**: Up to 2% (by Count).
2. **VARIETIES**: As per Northern Hard No. 1 and Southern Hard No. 1.

SOUTHERN HARD NO. 1

1. At least equal to Australian Standard White specifications except for:
   a) **PROTEIN MINIMUM**: At least 11.5% protein on 11% moisture basis. At sites where protein testing is unavailable up to 30% mottled grains (by count) are permitted.
2. **VARIETIES**: The only acceptable varieties are in:

SILO GROUP 3: BANKS, BASS, CONDOR, COOK, EAGLE, FLINDERS, GATCHER, HARRIER, HYBRID TITAN, KITE, OSPREY, SHORTIM, SKUA, SUNGLEN, [illegible], SUNECA, SUNELG, SUNKOTA, SUNSTAR, TAKARI, TERRA, TIMGALEN, TIMSON, VULCAN.

SILO GROUPS 4, 5 & 6: BANKS, BASS, CONDOR, COOK, FLINDERS, GATCHER, HARRIER, HYBRID TITAN, KITE, OSPREY, SHORTIM, SKUA, SUNGLEN, [illegible], SUNECA, SUNELG, SUNKOTA, SUNSTAR, TAKARI, TERRA, TIMGALEN, TIMSON, VULCAN.

SOFT BISCUIT WHEAT

1. Nominated stations as G.H.A.
2. Variety, quality etc. as determined by flour millers.

FEED WHEAT

Includes all sprouted wheat except for other grade specifications i.e. Prime Hard, Northern Hard No. 1 and Australian Hard No. 2. Feed wheat also includes Wheat with a test weight under 68 kg/hl and down to 62 kg/hl. Wheat received into this category may not attract dockages for other disorders.

FEED WHEAT IS TO BE BINNED SEPARATELY FROM GP UNDER ALL CIRCUMSTANCES.

Wheat Varieties Approved for the 1986 Season

Dr. L. J. Cook
Principal Agronomist (Cereals)
NSW Department of Agriculture

The Minister for Agriculture and Fisheries, Mr Jack Hallam, has issued the list of approved varieties for the 1986 season.

Only one new variety has been released. It is currently code-numbered M1265 and it will be named at the annual field day at Temora Agricultural Research and Advisory Station. It is a soft winter wheat of good ASW quality, with a cold requirement slightly longer than the other winter wheats Osprey and Quarrion. This means it can be sown perhaps 7-10 days earlier than those varieties. It is approved for receival in silo groups 4, 5 and 6 but will be received in silo group 3 without a varietal discount. In Departmental trials M1265 has outyielded Quarrion by about 14%, and it has also outyielded Osprey by about 5% in early sowings.

There should be substantial quantities of registered seed of the new variety available from this harvest.

While it is not strictly a new variety, Vulcan (formerly called DK2139) now appears on the approved list for silo groups 3, 4, 5 and 6.

This variety was actually approved for release some years ago, but it did not appear on the Minister's list as no seed was available until early in the 1985 season. It is expected there will be substantial quantities of seed available for the 1986 season, but growers should make sure that what they buy is actually Vulcan seed.

There are a number of other changes from the 1985 approved list.

- Hartog has been transferred from provisionally approved to approved in silo group 3, with emphasis that it be grown in high protein areas only.
- Cook is deleted from silo group 4 on the basis of poorer yield in that area than other approved varieties.
- Kite is deleted from silo group 6 on the same basis.
- Songlen has been deleted from the approved but outclassed category for silo groups 1, 2 and 3 because of much poorer yield than other approved varieties.
- Millewa is now in the approved but outclassed category for silo group 6 on the basis of susceptibility to stripe rust.
- Harrier has been deleted from approval for silo group 6 because of susceptibility to stripe rust.
- Olympic is in the approved but outclassed category for silo groups 4 and 5 on the basis of susceptibility to stripe rust, and also in group 6 because of poorer yield and susceptibility to stripe rust.
- The Cargill hybrid CH7 has been deleted from approval for silo groups 1, 2 and 3 because there will be no seed available for the 1986 season.
- Gatcher is in the approved but outclassed category for silo groups 1, 2 and 3 because of poorer yield compared to other approved varieties.

Australian Durum No. 1 Wheat
(New South Wales)

The Durum wheat Class is restricted to approved durum varieties at nominated sites. The varieties for the 1985/86 season are:

Dural, Duramba, Durati, Kamilaroi

Deliveries must be at least equal to Australian Standard White wheat standards, except for the following:

1. Protein minimum: At least 12% on an 11% moisture basis.
2. Up to 2% sprouted grains (by count) provided that individual load samples have a falling number of not less than 300 seconds.
3. Weather stained, blackpoint or fungus affected pink grains: up to 5% (by count).
4. Dry green, sappy, discoloured or distorted grains: up to 1% (by count).
5. Bread wheats: up to 3% (by count).

Australian Durum No. 2 Wheat
(New South Wales)

The Durum No. 2 wheat grade is restricted to approved durum varieties (according to Durum wheat No. 1) at nominated sites. Deliveries must be at least equal to Australian Standard White wheat standards, except for the following:

1. Up to 40% mottled grains (by count).
2. Up to 5% sprouted grains (by count) provided that individual load samples have a falling number of not less than 200 seconds.
3. Weather stained, black point or fungus affected pink grains: up to 10% (by count).
4. Dry green, sappy, discoloured or distorted grains: up to 2% (by count).
5. Bread wheats: up to 5% (by count).

NOTICE

GRAIN HANDLING AUTHORITY OF N.S.W.

THE QUALITY STANDARDS HAVE BEEN DETERMINED BY THE AUSTRALIAN WHEAT BOARD FOR THE 1986/87 SEASON. THE STANDARDS APPLY TO INDIVIDUAL LOADS AND MUST NOT BE AVERAGED OVER A NUMBER OF LOADS.

PAYMENT ENQUIRIES: AWB TOLL FREE NUMBER: 008 112413

WHEAT QUALITY STANDARDS

GENERAL

OUNDNESS AND MATURITY: Only sound, mature wheat is acceptable.
ED WHEATS: Red Wheats (e.g. Canadian Selkirk) may be tendered for delivery and will be received into the FEED WHEAT category. There is a nil tolerance into all other grades.
URUM WHEATS: Dural, Duramba, Durati or Kamilaroi is to be received only at nominated stations. Acceptability will be determined by the PWA. Lower grade Durum as per instructions.
EST WEIGHT: For acceptance as ASW or a higher grade, wheat must weigh at least 74 kg/hl. Wheat weighing less than 62 kg/hl must not be received without special instruction.
OISTURE LIMIT: Not more than 12%.
RIME HARD WHEATS: The PWA are responsible for the objective assessment of protein and falling number.

HOW TO USE THE CALCULATION TABLE

A. Refer to the Standards under Quality Details and find the defects applicable to the sample.
B. Follow this line across to the right and ensure the correct line is selected under GRADE below.
C. Go to the column in which the Chondrometer weight relates and apply the GRADE shown.

NOTE:
1. Dockages are not applicable to any GRADE.

VARIETIES

PRIME HARD: Banks, Cook, Gatcher, Hartog*, Hybrid Titan, Shortim, Songlen, Suneca, Sunkota, Sunstar, Timgalen.
NORTHERN & SOUTHERN HARD No. 1 & 2: Banks, Bass, Condor, Cook, Flinders, Gatcher, Harrier, Hybrid Titan, Kite, Osprey, Shortim, Skua, Songlen, Sundor, Suneca, Suneg, Sunkota, Sunstar, Takari, Tern, Timgalen, Timson, Vulcan.
Included in Silo Group 1 & 2. Hartog* and Comet
Included in Silo Group 3. Eagle, Hartog* and Comet
*HARTOG is only acceptable into the PH/AH Categories at sites that have protein testing available.

SOFT BISCUIT WHEAT
1. Nominated Stations in M.I.A.
2. Variety, quality etc. as determined by flour millers.

CATEGORY		QUALITY DETAILS	AUSTRALIAN STANDARD WHITE	PRIME HARD	NORTHERN & SOUTHERN HARD No. 1	NORTHERN & SOUTHERN HARD No. 2	GENERAL PURPOSE No. 1	GENERAL PURPOSE No. 2	FEED WHEAT	SUBJECT TO ASSESSMENT
1		CHONDROMETER WEIGHT	At least 74 kg/hl	At least 74 kg/hl	At least 74 kg/hl	At least 74 kg/hl	71 kg/hl & over	68 kg/hl - 70½ kg/hl	62 kg/hl - 67½ kg/hl	Under 62 kg/hl
2		MOISTURE	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%
3		PROTEIN MINIMUM	No Minimum	12.9%	11.5%	11.0%	N/A	N/A	N/A	N/A
4		UNMILLABLE MATERIAL — material passing through a 2mm screen and/or material other than wheat kernels, remaining on top of the screen after sieving								
	a)	Wheatheads, chaff, straw, backbone, wild radish and [illegible]	Not more than 7% (By Volume) which not more than 1% is small foreign seeds	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	Over 7% up to 15% (By Volume)	Over 15% up to 25% (By Volume)	Over 25% up to 50% (By Volume)	Over 50% (By Volume)
	b)	Small Foreign Seeds, that is any seed passing through a 2mm screen except those mentioned in any other category. Rape seed is classified as a small foreign seed.	Not more than 1% (By Volume)	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	Over 1% up to 5% (By Volume)	Over 5% up to 10% (By Volume)	Up to 10% (By Volume)	Over 10% (By Volume)
5	a)	WEED SEEDS & OTHER FOREIGN SEEDS All other cereal grains and any oil seeds and weed seeds not specified in other categories, black oats, seeds of lucerne, insect damaged wheat. "Small foreign seeds" (4b) are excluded from this category.	Not more than 50 in total per ½ litre	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	51 to 150 Seeds per ½ litre	151 to 200 Seeds per ½ litre	201 to 500 Seeds per ½ litre	Over 500 Seeds per ½ litre
	b)	Saffron thistle, variegated thistle, Mexican poppy, Vetches & [illegible], Paterson's Curse is only acceptable if there is no [illegible] [illegible] imparted to wheat.	Not more than 5 in total per ½ litre	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	6 to 10 Seeds per ½ litre	11 to 50 Seeds per ½ litre	Up to 50 Seeds per ½ litre	Over 50 Seeds per ½ litre
	c)	Sunflower seed, maize, soybean, lupins, field peas, double gees, safflower, lablab beans, chickpeas & lentils, Spiny Burr (American Burr, Bohemian Beaum)	Not more than 1 in total per ½ litre	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	2 to 20 Seeds per ½ litre	21 to 50 Seeds per ½ litre	51 to 100 Seeds per ½ litre	Over 100 Seeds per ½ litre
	d)	Thornapple (Datura spp.), Bathurst, Noogoora burr and cottonseed.	Not more than 1 in total per ½ litre	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	over 1 in total per ½ litre
6		ERGOT OF WHEAT ERGOT OF RYE GRASS	Not more than 5 pieces in total per ½ litre	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	ASW Tolerance to apply	over 5 pieces in total per ½ litre
7		SPROUTED GRAIN Sprouted kernels are those in which the covering of the germ is split open, and any further advanced stage of growth to the extent of the germ having grown or shot. (For the assessment of sprouted grains, counts should be made on a minimum sub-sample of 300 grains.)	NIL	Up to 2% (By Count)	Up to 2% (By Count)	Up to 5% (By Count)	NIL (Wheat will be accepted providing the falling number is at least 300 seconds)	Up to 1% (By Count) (Wheat will be accepted providing the falling number is at least 200 seconds)	Unlimited	N/A
8		FALLING NUMBER Minimum on individual Load Samples. (Except for Northern & Southern Hard No. 2 where Season Falling Number will apply.)	N/A	Not less than 350 seconds	Not less than 300 seconds	Not less than 250 seconds	Not less than 300 seconds	Not less than 200 seconds	N/A	N/A
9		FUNGAL STAINED GRAINS includes blackpoint, black tip, pink grains and grains discoloured by field fungi.	Not more than 10% (By Count)	ASW Tolerance to apply	ASW Tolerance to apply	Up to 20% (By Count)	Over 10% up to 25% (By Count)	Over 25% up to 50% (By Count)	Up to 50% (By Count)	Over 50% (By Count)
10		DRY GREEN OR SAPPY GREEN GRAINS, FROST AFFECTED, DISEASE OR DRYING OPERATIONS	Not more than 1% (By Count)	ASW Tolerance to apply	ASW Tolerance to apply	Not more than 2% (By Count)	Over 1% up to 10% (By Count)	Over 10% up to 20% (By Count)	Over 20% (By Count)	N/A
11		OTHER OBJECTIONABLE FOREIGN MATTER Wheat which has been treated with a pickling compound, which contains live insects or which has been treated with any chemical not approved for grains. Tainting agents liable to impart an objectionable smell or taste to wheat including plant parts and seeds of Eucalyptus and Wild Garlic. Grains infected with Bell Smut fungus, heat damaged, bin burnt or mouldy grain, general rubbish comprising of sticks, stones, earth, sand and/or any other objectionable contaminants not otherwise listed in these standards.	NIL IN ALL GRADES	Growers tendering wheat containing excessive unmillable material, foreign seeds or other objectionable matter for which a nil tolerance has been set, are advised to have the wheat cleaned. Any grower unable or unwilling to do so may have his wheat received at a time convenient to the Board and at a dockage to be determined by the State Manager of the Australian Wheat Board. However, wheat which contains live insects or which has been treated with a pickling compound or any chemical not approved for application to grain, will not be received in any circumstances.						
12		INTERIM PAYMENT 100% of THE PRELIMINARY GMP per tonne less Freight Charges, Storage & Handling Charges, Research Levy, Consumer Costs, Overseas Wharfage & Cane House Deductions	$117.56	$133.76	$122.06	$117.56	$107.66	$90.56	$77.06	N/A

S.T.A. Means "Subject to Assessment" by the State Manager of the Australian Wheat Board. If so requested, samples of S.T.A. wheat should be sent to the Head Office of the G.H.A. for his attention, and the wheat must not be received [illegible] as to classification and dockage. This includes assessment as to whether or not wheat is suitable for [illegible] into Feed Category.

nce Graham
ANAGING DIRECTOR
CTOBER 1986

ALL GRADES MUST BE STORED SEPARATELY IN DEPOTS AND BUNKERS EACH GRADE MUST BE KEPT AS A SEPARATE PARCEL. IF THIS IS NOT POSSIBLE THE APPROVAL OF THE REGIONAL MANAGER MUST BE OBTAINED BEFORE ANY ACTION IS TAKEN.

FEED WHEAT: IS TO BE BINNED SEPARATELY FROM GP No. 1 AND GP No. 2 UNDER ALL CIRCUMSTANCES.

Australian Durum No. 1 Wheat (New South Wales)

- The Durum wheat class is restricted to approved durum varieties at nominated sites. The varieties for the 1986/87 season are:
  Dural, Duramba, Durati, Kamilaroi
- Deliveries must be at least equal to Australian Standard White wheat standards, except for the following:

1. Protein minimum: At least 12.8% on an 11% moisture basis.
2. Up to 2% initial tolerance for sprouted wheat (by count), provided that individual load samples have a falling number of not less than 300 seconds.
3. Weather stained, blackpoint or fungus affected pink grains: up to 5% (by count).
4. Dry green, sappy, discoloured or distorted grains: up to 1% (by count).
5. Bread wheats: up to 3% (by count).

Australian Durum No. 2 Wheat (New South Wales)

- The Durum No. 2 wheat grade is restricted to approved durum varieties (according to Durum Wheat No. 1) at nominated sites.
- Deliveries must be at least equal to Australian Standard White wheat standards, except for the following:

1. Protein minimum: At least 11.5% on an 11% moisture basis.
2. Up to 5% initial tolerance for sprouted wheat (by count), provided that individual load samples have a falling number of not less than 200 seconds.
3. Weather stained, blackpoint or fungus affected pink grains: up to 10% (by count).
4. Dry green, sappy, discoloured or distorted grains: up to 2% (by count).
5. Bread wheats: up to 5% (by count).

AUSTRALIAN WHEAT BOARD

[illegible] WHEAT QUALITY STANDARDS 1987/88

THE STANDARDS APPLY TO INDIVIDUAL LOADS AND MUST NOT BE AVERAGED OVER A NUMBER OF LOADS.

	QUALITY DETAILS	AUSTRALIAN STANDARD WHITE	PRIME HARD	AUSTRALIAN HARD No. 1	AUSTRALIAN HARD No. 2	GENERAL PURPOSE No. 1	GENERAL PURPOSE No. 2	FEED-WHEAT	SUBJECT TO ASSESSMENT
1	CHONDROMETER TEST WEIGHT	At least 74 kg/hl	At least 74 kg/hl	At least 74 kg/hl	At least 74 kg/hl	71 kg/hl & over	68 kg/hl 70½ kg/hl	62 kg/hl 67½ kg/hl	Under 62 kg/hl
2	MOISTURE	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%	Not more than 12%
3	PROTEIN MINIMUM	No Minimum	12.0%	11.5%	11.0%	No Minimum	No Minimum	No Minimum	N/A
4	FALLING NUMBER Minimum on individual Load Samples (Except for Northern & Southern Hard No. 2 where Seasonal Falling Number will apply)	N/A	Not less than 300 seconds	Not less than 300 seconds	Not less than 250 seconds	Not less than 300 seconds	Not less than 200 seconds	300 seconds and below	N/A
5	UNMILLABLE MATERIAL — material passing through a 2 mm screen and/or material other than wheat kernels remaining on top of the screen after sieving								
a	TOTAL above and below screen (maximum % by volume)	Not more than 7% (By Volume)	Not more than 7% (By Volume)	Not more than 7% (By Volume)	Not more than 7% (By Volume)	Over 7% up to 15% (By Volume)	Over 15% up to 25% (By Volume)	Over 25% up to 40% (By Volume)	Over 40% (By Volume)
(i)	Below the screen (maximum % by volume)	Not more than 5% (By Volume)	Not more than 5% (By Volume)	Not more than 5% (By Volume)	Not more than 5% (By Volume)	Over 5% up to 10% (By Volume)	Over 10% up to 15% (By Volume)	Over 15% up to 30% (By Volume)	Over 30% (By Volume)
(ii)	[illegible]								
(iii)	Small Foreign Seeds, that is any seed passing through a 2 mm screen except those mentioned in any other category. Rape seed is classified as a small foreign seed	Not more than 1% (By Volume)	Not more than 1% (By Volume)	Not more than 1% (By Volume)	Not more than 1% (By Volume)	Over 1% up to 5% (By Volume)	Over 5% up to 10% (By Volume)	Up to 20% (By Volume)	Over 20% (By Volume)
6	GRAIN DEFECTS	MAXIMUM TOLERANCES PER 300 GRAIN SAMPLE							
a	SPROUTED GRAIN Sprouted kernels are those in which the covering of the germ is split open, and any further advanced stage of growth to the extent of the germ having grown a shoot. (For the assessment of sprouted grain, counts should be made on a minimum sub sample of 300 grains)	NIL	Up to 2% (By Count)	Up to 2% (By Count)	Up to 5% (By Count)	NIL (Wheat will be accepted providing the falling number is at least 300 seconds)	Up to 1% (By Count) (Wheat will be accepted providing the falling number is at least 200 seconds)	Unlimited	Unlimited
b(i)	FUNGAL STAINED GRAINS [illegible]	Not more than 5% (By Count)	Not more than 5% (By Count)	Not more than 5% (By Count)	Up to 10% (By Count)	Up to 10% (By Count)	Up to 50% (By Count)	Up to 50% (By Count)	Over 50% (By Count)
(ii)	[illegible]								
(iii)	Pink Grain affected by the fungi Fusarium	Not more than 2% (By Count)	Not more than 2% (By Count)	Not more than 2% (By Count)	Not more than 2% (By Count)	Up to 5% (By Count)	Up to 5% (By Count)	Up to 5% (By Count)	Over 5% (By Count)
c	DRY GREEN, SAPPY GREEN AND FROST AFFECTED GRAINS, AND THOSE AFFECTED BY DROUGHT OR DRYING OPERATIONS	Not more than 1% (By Count)	Not more than 1% (By Count)	Not more than 1% (By Count)	Not more than 2% (By Count)	Up to 10% (By Count)	Up to 20% (By Count)	Over 20% (By Count)	Unlimited
d	HEAT DAMAGED [illegible]	NIL	NIL	NIL	NIL	NIL	NIL	NIL	Greater than NIL
e	GRAINS INFECTED WITH BALL SMUT	NIL	NIL	NIL	NIL	NIL	NIL	NIL	Greater than NIL
f	INSECT DAMAGED GRAIN	Not more than 1% (By Count)	Not more than 1% (By Count)	Not more than 1% (By Count)	Not more than 1% (By Count)	Not more than 2% (By Count)	Not more than 2% (By Count)	Not more than 4% (By Count)	Over 4% (By Count)
7	GRAIN CONTAMINANTS	MAXIMUM TOLERANCES [illegible]							
A	SEED CONTAMINANTS TOLERANCES APPLY TO WHOLE SEEDS OR THEIR EQUIVALENT IN PIECES								
(i)	[illegible]	NIL	NIL	NIL	NIL	NIL	NIL	NIL	Greater than NIL
(ii)	Thornapple (Datura spp.), Bathurst, Noogoora burr and [illegible]	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Over 1 in total per ½ litre
(iii)	[illegible]	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	Not more than 1 in total per ½ litre	2 to 15 Seeds per ½ litre	16 to 50 Seeds per ½ litre	51 to 100 Seeds per ½ litre	Over 100 Seeds per ½ litre
(iv)	[illegible]	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	6 to 10 Seeds per ½ litre	11 to 30 Seeds per ½ litre	31 to 50 Seeds per ½ litre	Over 50 Seeds per ½ litre
(v)	[illegible]	Not more than 50 in total per ½ litre	Not more than 50 in total per ½ litre	Not more than 50 in total per ½ litre	Not more than 50 in total per ½ litre	51 to 150 Seeds per ½ litre	151 to 200 Seeds per ½ litre	201 to 400 Seeds per ½ litre	Over 400 Seeds per ½ litre
B	ERGOT								
(i)	ERGOT OF RYE GRASS	Not more than 5 pieces in total per ½ litre	Not more than 5 pieces in total per ½ litre	Not more than 5 pieces in total per ½ litre	Not more than 5 pieces in total per ½ litre	Not more than 5 pieces in total per ½ litre	Not more than 5 pieces in total per ½ litre	Not more than 5 pieces in total per ½ litre	Over 5 pieces per ½ litre
(ii)	ERGOT OF WHEAT	Not more than 1 piece in total per ½ litre	Not more than 1 piece in total per ½ litre	Not more than 1 piece in total per ½ litre	Not more than 1 piece in total per ½ litre	Not more than 1 piece in total per ½ litre	Not more than 1 piece in total per ½ litre	Not more than 1 piece in total per ½ litre	Over 1 piece per ½ litre
C	DEAD STORED GRAIN INSECTS	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Not more than 5 in total per ½ litre	Over 5 per ½ litre
D	OTHER OBJECTIONABLE FOREIGN MATTER [illegible]	NIL ALL GRADES	[illegible]						
8	INTERIM PAYMENT [illegible]								N/A

ALL GRADES MUST BE STORED SEPARATELY IN DEPOTS AND BUNKERS EACH GRADE MUST BE KEPT AS A SEPARATE PARCEL. IF THIS IS NOT POSSIBLE THE APPROVAL OF THE REGIONAL MANAGER MUST BE OBTAINED BEFORE ANY ACTION IS TAKEN.

FEED WHEAT IS TO BE BINNED SEPARATELY FROM GP No. 1 AND GP No. 2 UNDER ALL CIRCUMSTANCES.

Graham Lawrence
N.S.W. MANAGER

[illegible]

GENERAL

RED WHEATS: Red Wheats (e.g. Canadian Selkirk) may be tendered for delivery and will be received into the **FEED WHEAT** category. There is a nil tolerance into all other categories.

DURUM WHEATS: Durat, Duramba, Durati or Kamilaroi is to be received only at nominated stations. Acceptability will be determined by the FWA. Lower grade Durum as per instructions.

SOFT BISCUIT WHEAT
1. Nominated Stations in M.I.A.
2. Variety, quality etc. as determined by flour millers

HOW TO USE THE CALCULATION TABLE

A. Refer to the table under Quality Details and find the defects applicable to the sample
B. Follow this line across to the right and ensure the correct line is selected under GRADE details
C. Go to the column to which the Chondrometer weight refers and apply the GRADE shown

S.T.A. Means "Subject to Assessment" by the State Manager of the Australian Wheat Board. If so requested, samples of S.T.A. wheat should be sent to the Head Office of the G.H.A. for his attention, and the wheat must not be received pending advice as to classification and dockage. This includes assessment as to whether or not wheat is suitable for receival into Feed Category.

VARIETIES

PRIME HARD: Banks, Cook, Gatcher, Hartog, Hybrid Titan, Shortim, Songlen, Sunco, Suneca, Sunkota, Sunstar, Timgalen.

NORTHERN & SOUTHERN HARD No. 1 & 2: Banks, Bass, Condor, Cook, Flinders, Gatcher, Hamer, Hybrid Titan, Kite, Osprey, Shortim, Skua, Songlen, Sunco, Sundor, Suneca, Sunelg, Sunkota, Sunstar, Takari, Terra, Timgalen, Timson, Vulcan

Included in Silo Group 1 & 2 Hartog, Comet, Vasco
Included in Silo Group 3 Eagle, Hartog*, Comet, Vasco, Sunbird
Included in Silo Group 4, 5 & 6 Sunbird

* HARTOG is only acceptable into the PH/AH Categories at sites that have protein testing available.

PAYMENT ENQUIRIES:

AWB TOLL FREE NUMBER: (008) 11 2413

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APPENDIX C

INSECT DOCUMENTATION

Export Control Act 1982

ORIGINAL

Document 1

SHIP INSPECTION REPORT AND TREATMENT ORDER

6276

A. REPORT

Name of ship: "KOOKABURRA" Registered Call Signal or Official Number: J8LT

Previous Names: None

De rat certificate, date and place of issue: Oriental Shipping Company

Details of loading: 1. Port of: Sydney Expected Tonnage: 22,000 Destination: Japan

2. Port of: Newcastle Expected Tonnage: 10,000

Details of last two cargoes:

1. Commodity: Iron Ore Origin: Peru Date: 10/84
2. Commodity: General cargo Origin: USA Date: 8/84

Details of last grain or oilseed cargo (where applicable): Type of grain: Maize, Wheat, Sorghum Origin: South America Date: 2/84

Agent: Smith & Jones Ltd Marine Surveyor: B.Border.

Inspectors: Capt. Hook Place of Inspection: 17/12/84

Site of Inspection	Hold 1 LH	TD	Hold 2		Hold 3		Hold 4		Hold 5	
Hatch covers	C	C	C	C	C	C	C	C	C	C
Deck beams	LG	LG	HG	HG	LG	LG	C	C	C	C
Cable casings	-	LG	-	LG	-	C	-	C	-	C
Pipe casings	G	G	G	G	G	C	C	C	C	C
Ventilation trunking	-	-	-	-	-	-	-	-	-	-
Steel bulkheads	C	C	C	C	S	S	C	C	C	C
Spar ceiling	-	-	-	-	-	-	-	-	-	-
Exposed metal surfaces	C	C	C	C	C	C	C	C	C	C
Steel tank-top ceilings	LG	-	HG	-	LG	-	C	-	C	-
Bilges	G	-	GW	-	G	-	C	-	W	-
Dunnage	-	C	-	C	-	-	-	-	-	-
Total infestation for space (L or H)										

Storerooms	L	Galley areas	-	Focsle lockers	LG	Mast houses	C	Weather deck	G	Other	-

Key: L Light infestation; H Heavy infestation; T Trogoderma sp; G Grain; M Mineral residues; R Rodents; S Scale; W Water; O Other; C clear (all defects)

NOTE: More than one letter indicates more than one condition present e.g. LS indicates light infestation of insects plus scale in inspected area.

Residue type: Maize, rice, wheat, sorghum, rust scale

B. TREATMENT ORDER

To the Master: You are advised that the ship is not to be used for the export of prescribed goods until the action indicated in the following ticked boxes has been taken, after which a further inspection will be required.

	Hold 1 LD	TD	Hold 2		Hold 3					
Clean*	✓1,2,4	✓1,2,4	✓1,3,4	✓1,3,4	✓1,2,4	✓1,2,4				
Descale	-	-	-	-	-	-				
Dismantle/Remove	-	-	-	-	-	-				
High Volume Spray	✓	✓	-	-	✓	✓				
Gas Fumigate			✓	✓						

Tick (✓) action required

Key*: 1. residues to be retained for further inspection: 2. residues to be removed prior to treatment: 3. residues to remain in hold during treatment: 4. on completion of action, residues to be handed to a Quarantine Officer~~/retained on board for disposal at sea.~~

Additional treatment and remarks (continue on continuation sheet if necessary): Marine Surveyor ordered descaling in No. 3 Hold and drying of No. 5 bilge wells. 20 bags of grain and scale removed under Quarantine Supervision.

Treatment ordered by Marine Surveyor (tick appropriate box): Clean ☐ Descale ☑ Other ☑

Date and time of issue: 10.15 am 17/12/84 Inspectors Signature: P. Piper

C. (Office Use Only)

DETAILS OF TREATMENT

Spray or Bait 1. Chemical used: Fenitrothion 2. % active ingredient: 1%

3. Treatment carried out by: Personalised Pest Control

Fumigation 1. Fumigant used: Methyl bromide 2. Dosage: 32 gm/m^3

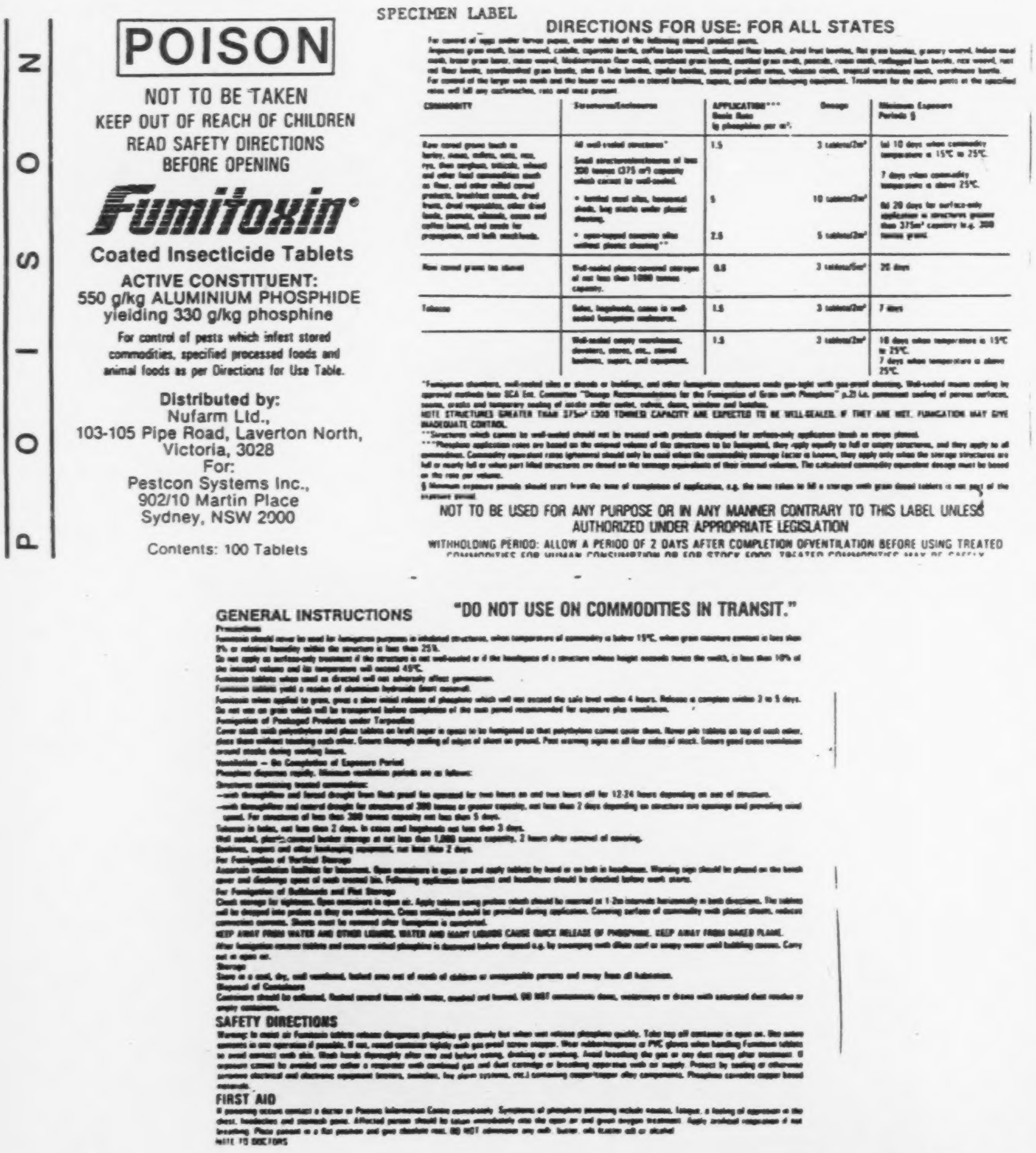
3. Exposure period: 24 hours 4. Fumigation carried out by: Personalised Pest Control

Times and dates for all inspections and reinspections: 6.30 - 10.15 am 17/12/84 8.00 - 11.00 am 19/12/84

Insect sample No. holds etc. 2016 Insect sample No. storerooms, galley areas etc. 2017

E248—8/84

Document 2



SPECIMEN LABEL

P O I S O N

POISON

NOT TO BE TAKEN
KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS
BEFORE OPENING

Fumitoxin®

Coated Insecticide Tablets

ACTIVE CONSTITUENT:
550 g/kg ALUMINIUM PHOSPHIDE
yielding 330 g/kg phosphine

For control of pests which infest stored commodities, specified processed foods and animal foods as per Directions for Use Table.

Distributed by:
Nufarm Ltd.,
103-105 Pipe Road, Laverton North,
Victoria, 3028
For:
Pestcon Systems Inc.,
902/10 Martin Place
Sydney, NSW 2000

Contents: 100 Tablets

DIRECTIONS FOR USE: FOR ALL STATES

[illegible]

COMMODITY	Structures/Enclosures	APPLICATION*** Basic Rate (g phosphine per m³)	Dosage	Minimum Exposure Periods §
[illegible]	All well-sealed structures* [illegible]	1.5	3 tablets/2m³	(a) 10 days when commodity temperature is 15°C to 25°C. 7 days when commodity temperature is above 25°C.
	[illegible]	5	10 tablets/2m³	(b) 20 days for surface-only application in structures greater than 375m³ capacity [illegible]
	[illegible]	2.5	5 tablets/2m³	
[illegible]	[illegible] 1000 tonnes capacity.	0.8	3 tablets/5m³	20 days
Tobacco	[illegible]	1.5	3 tablets/2m³	7 days
	[illegible]	1.5	3 tablets/2m³	10 days when temperature is 15°C to 25°C. 7 days when temperature is above 25°C.

*[illegible]

NOTE: STRUCTURES GREATER THAN 375m³ (300 TONNES) CAPACITY ARE EXPECTED TO BE WELL-SEALED. IF THEY ARE NOT, FUMIGATION MAY GIVE INADEQUATE CONTROL.

**[illegible]

***[illegible]

§ [illegible]

NOT TO BE USED FOR ANY PURPOSE OR IN ANY MANNER CONTRARY TO THIS LABEL UNLESS AUTHORIZED UNDER APPROPRIATE LEGISLATION

WITHHOLDING PERIOD: ALLOW A PERIOD OF 2 DAYS AFTER COMPLETION OFVENTILATION BEFORE USING TREATED COMMODITIES FOR HUMAN CONSUMPTION OR FOR STOCK FOOD. TREATED COMMODITIES MAY BE SAFELY

GENERAL INSTRUCTIONS

"DO NOT USE ON COMMODITIES IN TRANSIT."

[illegible]

SAFETY DIRECTIONS

[illegible]

FIRST AID

[illegible]

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Department of Agriculture
New South Wales

Agdex
100/615

Insect pests of stored grain

Insecticide and fumigant recommendations

Supplement to Agfact P1.AE.1 October 1987
Howard Greening, Senior Entomologist
Biological and Chemical Research Institute
Rydalmere

Insect control is essential for storing grain successfully. Clean and disinfest headers, grain handling equipment and storages, which should be sealable in case fumigation is necessary. Apply a protectant treatment to all grain when filling storages (except grain for delivery within 4 weeks to the Grain Handling Authority of N.S.W.). If the protectant treatment has been neglected and insects develop, destroy the infestation by fumigation.

Grain must be dry for safe storage. For wheat, barley, oats and triticale the grain moisture content should not exceed 12%; for sorghum the limit is 13.5% and for maize it is 14%.

The names of the insecticides and fumigants are given in terms of the standard common names of the active constituents in registered proprietary products. This name is given on the label, usually near the proprietary product name.

IMPORTANT: PESTICIDES AND ALLIED CHEMICALS ACT 1978.

Take not that you must use only a registered pesticide and it must not be used for any purpose or in any manner contrary to the directions on the label unless a permit hs been obtained under the Act.

Purpose	Insecticide	Mixing rate per litre of water	Notes
Disinfesting grain handling equipment (headers, augers, mobile bins) and grain storage areas. Clean thoroughly then apply the spray to wet all surfaces.	azamethiphos	5, 10 or 20 g of 500 g/kg wettable powder.	Azamethiphos is used at 5 g/L for grain handling equipment or at higher rates for storage areas, where 20 g/L is needed on concrete surfaces or for long control.
	OR pirimiphos-methyl plus carbaryl	11 mL of 900 g/L concentrate and 10 mL of 500 g/L concentrate.	Pirimiphos-methyl is used at 22 mL/L on unpainted concrete. Carbaryl is registered for treatment of grain storage areas only.
	OR dichlorvos	10 mL of 500 g/L concentrate.	Dichlorvos is used for rapid disinfestation, not long control. It is also applied by aerosol, for example as 5% dichlorvos in carbon dioxide. The Department of Industrial Relations classifies dichlorvos "moderately to highly hazardous" to the user. Product labels list precautions to be taken.
	OR fenitrothion 12 g/kg with carbaryl 8 g/kg dust product OR silica aerogel on diatomite (a sorptive mineral dust)		Apply a light covering of dust to all surfaces. Surfaces must be thoroughly dry before treatment. Remove surplus dust before harvest by running the machinery with covers open.

Purpose	Insecticide	Mixing rate per litre of water	Notes
Grain protectant treatment — applied to uninfested grain *to prevent insect development in storage.*	GROUP A		
	pirimiphos-methyl	4.5 mL of 900 g/L concentrate	Apply a spray treatment at 1 L of the diluted mixture per tonne, or a dust treatment as recommended below, to grain on intake to storage. Group A insecticides may be ineffective against lesser grain borer. For full protection, the required amount of a Group B insecticide should be added to the Group A mixture. Alternatively a Group C or Group D treatment may be used alone.
	OR chlorpyrifos-methyl	10 or 20 mL* of 500 g/L concentrate	
	OR fenitrothion	6 or 12 mL* of 1 kg/L concentrate	The continuing usefulness of this fenitrothion treatment may be in doubt in some areas because of fenitrothion resistance in saw-toothed grain beetle.
	GROUP B		
	bioresmethrin with piperonyl butoxide	10 or 20 mL* of 50 g/L concentrate	Beware of overdosing grain on intake to aerated storage. Refer to label.
	OR carbaryl	10 or 16mL* of 500 g/L concentrate	
	GROUP C		
	pyrethrins with piperonyl butoxide	53 mL of 60 g/L concentrate	This pyrethrin treatment prevents infestation largely by repelling grain insects. Pre-harvest cleaning and insect control in machinery and storages must be very thorough to ensure that the grain is insect-free initially. This is a particularly useful treatment for long-term, e.g. 2 years, protection of grain stored for farm use.
	GROUP D		
	fenitrothion 12 g/kg with carbaryl 8 g/kg dust product	—	Apply 0.5 kg dust per tonne to uninfested grain on intake to storage. Not suitable for sorghum seed.
	OR silica aerogel on diatomite (a sorptive mineral dust)	—	Apply 1 kg dust per tonne to uninfested grain on intake to storage. This is a useful treatment for long-term protection of dry farm-stored grain, but grain so treated is not acceptable to bulk handling authorities. Dust must be applied evenly to avoid auger chokes.

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* The higher rate is for grain that will be stored for more than 3 months. The pirimiphos-methyl rate is not increased for long storage.

Purpose	**Insecticide**	**Mixing rate per litre of water**	**Notes**
Treating infested grain when fumigation is impracticable	dichlorvos	12 mL of 500 g/L concentrate OR 5.3 mL of 1.14 kg/L concentrate	Apply, at 1 L of the diluted spray per tonne, to infested grain as it is augered from one storage into another. Dichlorvos is vapour-active and kills insects within the grain kernels. It is toxic to man both as spray liquid and as vapour. The Department of Industrial Relations classifies dichlorvos "moderately to highly hazardous" to the user. Product labels list precautions to be taken. Leave the grain in storage for at least 7 days after treatment, before moving or using it. This dosage (6 ppm) is recommended for disinfesting grain destined for flour milling. If treatment for another purpose is necessary, at the higher dosage as per label directions, the grain should be held in store after treatment and should not be used for processing into food until the dichlorvos residue has declined to 2 ppm.
Grain fumigation (in storages that are as gas-tight as possible), *to destroy insect infestation in grain.* This is a salvage operation that should not be needed if a grain protectant treatment is used correctly.	phosphine, from tablets, pellets or sachets containing aluminium phosphide	5 g phosphine/m³ (6 g/t) (for bolted steel silos and sheds or bag stacks under plastic sheeting; lower dosages are indicated on product labels for some other types of storages).	Add the fumigant tablets or pellets by probing or turning the grain. In bins designed for sealing and in well sealed bunker storages, sachets ("bag chains") or pellets in flat plastic/paper packs ("pre-pacs") may be laid on the grain surface. Fumigate for 10 days when the grain temperature is 15°C-25°C or 7 days if it is above 25°C. Ventilate for 5 days after unsealing the storage before moving the grain or entering the storage. For bunker storage where low dosages and very long fumigation periods are used, allow at least 2 hours' ventilation, after removing covers, before working with or moving the grain.
	OR carbon disulphide (not suitable if the temperature is less than 16° C).	120 mL/m³ when the atmospheric temperature is in the range 16-21°C. Above 21°C use half the dose. Calculate dosage according to volume of the storage rather than the amount of grain in it.	Distribute the liquid carbon disulphide over the grain surface in storages or at the top of bag stacks covered with plastic sheeting. *This fumigant is highly flammable. No smoking. Liquid or vapour must not be exposed to fire, sparks (e.g. from electrical or welding equipment), embers or very hot metal (e.g. motor exhaust pipes).* Fumigate for 24 to 48 hours (not more than 24 hours for seed). Ventilate for 3 days after unsealing the storage.

APPENDIX D

COMPARISONS OF SAMPLING AND INSPECTION, AND HANDLING PRACTICES TO THE U.S.

TABLE 7.1. GRAIN HANDLING PRACTICES: FARM TO ELEVATOR MOVEMENT

Statement	Australia	U.S.
	Wheat is cleaned on farm prior to delivery. It is placed in bins by groups of varieties according to protein content and baking characteristics of variety. Grain must be free of insects.	Wheat is received and placed in bin by quality often without cleaning or conditioning.
Drying	Wheat is generally harvested at moisture content between 9 to 11%. Therefore, seldom a necessity for drying.	High moisture wheat is dried, especially if it is to be stored. Generally, dried only to the maximum level for storage. It may be stored or blended with other wheat of different moisture.
Cleaning	Wheat is cleaned on the farm prior to delivering to the country elevator. Grain combines are equipped with double headers for additional cleaning when necessary. Few, if any, country elevators have cleaners. Wheat is rejected if it does not meet receival standards.	Generally, wheat is not cleaned when coming off the farm. It is binned by quality and often blended with other wheat of different quality when loaded out. Many country elevators do not have cleaners. Wheat is seldom, if ever, rejected if it contains a high percentage of dockage and foreign material.
Insect Treatment	Wheat found to contain insects at time of delivery is not allowed into the storage system. It must be disinfested before it can be delivered.	Little, if any, treatment for insects at time of storage.
Storage	May be stored in silo or bunker type storage. Grain is inspected at regular intervals for signs of deterioration or insect infestation.	Generally stored in silo type bins which expedite blending at time of shipment. Grain is monitored for hot spots, but little conditioning done when in storage.
Screenings and FM	Effective weed control and adjusting of grain combines provides low level of screenings and foreign material when delivered to elevator.	Little attempt by farmer to clean grain beyond normal weed control and grain combine.
Disposal of Screenings	Grain is cleaned on farm. Elevators do not have cleaners, therefore, there is no accumulation of screenings. Sophisticated dust systems provide clean facilities. Dust is destroyed.	Used to blend with grain at time of loading to obtain maximum limits allowed in contract or sold directly as screenings.

TABLE 7.2. GRAIN HANDLING PRACTICES: INTER-ELEVATOR MOVEMENTS (INCLUDING INBOUND TO EXPORT)

Statement	Australia	U.S.
	Wheat is clean prior to placing in bins. Wheat is segregated by groups of varieties according to protein level.	Received and placed in bins according to quality.
Drying	Most wheat is harvested at 9 to 11% moisture. Most inter-elevators do not have driers.	Blending of different moisture levels is practiced in an effort to meet the maximum level contracted for. Drying may be needed for storage.
Cleaning	Since grain is clean when it comes off the farm there is little concern with cleaning.	Wheat of different quality levels is blended together to meet grade and protein levels. Some cleaning, especially of dockage, takes place. Screenings, in the past, have been blended in to meet certain FM & Dockage levels.
Screening Disposal	Cleaning is not done because wheat is cleaned on the farm. Dust is dumped or otherwise destroyed.	Generally used to mix with grain at time of loading to attain maximum limits allowed by the contracted grade.
Blending	There does not seem to be the desire or necessity to blend wide margins of different quality. Seldom are more than two bins blended together. The Australian Wheat Board has specific knowledge as to quality at each location. They request deliveries by this quality, so it makes it difficult to perform blending.	Blending of different quality is commonly practiced to meet the contracted grade.

TABLE 7.3. GRAIN HANDLING PRACTICES: EXPORT

Statement	Australia	U.S.
Export Elevator Movements	Received and placed in bins according to specific shipments as directed by the Australian Wheat Board.	Received and placed in bins according to quality. Grain is seldom rejected regardless of quality.
Drying	Few export elevators have driers. Most wheat is harvested at 9 to 11% moisture.	Most export elevators have large drying capabilities. Corn and soybeans are often dried at export locations. Wheat, except for local farm crop, seldom requires drying.
Cleaning	Export elevators do not have cleaners. Grain is cleaned on the farm prior to delivery to the market.	Most export elevators have huge cleaning capacity. Grain is often cleaned prior to exporting in an effort to meet the maximum limits of a contract.
Screenings	Elevators do not accumulate screenings. Accumulated dust is dumped or otherwise destroyed.	Often used to mix with grain at times of loading to obtain maximum limits allowed under contract. Some sold for animal feed.
Insect Infestation	Australia has a zero tolerance on insects. The Department of Primary Industry enforces strict hygiene standards. If one insect is found, operations are suspended.	Present U.S. Standards allow up to 1 insect in each 1250 grams sample representing 5,000 bu. of grain loaded. If more than the allowed tolerance is found loading may continue and the ship hold(s) fumigated at completion of loading.

TABLE 7.4. SAMPLING AND INSPECTION SYSTEM: PRODUCER TO ELEVATOR

Statement	Australia	U.S.
	Every load of grain is inspected and the results sent to Australian Wheat Board.	Inspection is permissive.
Standards Applied	All inspections are performed by elevator personnel, using standards established by the Australian Wheat Board.	Elevator has option to use official inspectors or perform own inspection.
Review Inspection	No review inspection performed but a daily composite sample is sent to the AWB.	No review inspection performed on elevator inspections, but a submitted sample may be sent to official agency for analysis.
Equipment Used to Obtain Sample	Samples are obtained by use of an open throat probe.	If sample is obtained by elevator personnel an open throat or compartmented trier or DT sampler may be used. If sample is drawn by official personnel, a compartmented trier, DT sampler or other official method must be used.

TABLE 7.5. SAMPLING AND INSPECTION SYSTEMS: INTER-ELEVATOR MOVEMENTS (INCLUDING INBOUND TO EXPORT)

Statement	Australia	U.S.
	No inspection for quality is conducted. A truck card reflecting the class and quality of grain is placed on each side of the railroad car. All grain is examined for insects and if found, must be disinfested before shipment.	Inspection is permissive.
Standards	Wheat shipped between elevators must meet the quality specified by the AWB. This is based on the declaration reported to the AWB by the interior elevator at the time they received it in storage.	Grain shipped between elevators may be of any grade.

TABLE 7.6. SAMPLING AND INSPECTION SYSTEMS: EXPORT

Statement	Australia	U.S.
	There is no statutory authority requiring official inspection. Inspection is provided by two separate bodies. The Department of Primary Industry inspects to see that grain is insect free and fit for export. The responsible authority inspecting for quantity and quality may vary between states.	Law requires inspection by official inspection personnel on all export grain except as provided in certain cases by waiver.
Vessel Exam	Same as U.S. except that if a single insect injurious to stored grain is found the vessel is declared unfit to load grain.	Vessel must be examined prior to loading for condition such as clean, dry, and free of live insect infestation. Not more than two insects injurious to stored grain are allowed.
Export Quality	About 77.0% of Australian wheat exports are of the class Australian Standard White. Factor limits are 74 KHL (57.5 lbs.) TW, 12.0% MO, no sprout, no insects, and other factor limits as shown in Appendix 2. Grain flow to the vessel is stopped if grain does not meet quality specified.	Any quality of grain may be exported that is agreed to under contract. Most U.S. grain grades either 2 or 3. Maximum limits are strived for by elevator on each factor. Sublot results may exceed grade limit, but if they exceed Cu-Sum loading plan sublot is certified separately.
Sampling	DT Mechanical sampler is used.	DT Sampler required.
Insect Exam	Continuous examination of all grain obtained by secondary DT sampler. Inspection performed by Department of Primary Industry. If a single insect is found, vessel hold is fumigated.	Examine 1250 grams from each 5000 bu. loaded. Insect tolerance established by HB II.
Sample Analyzed	Sublot samples of each 350 tons (12,860 bu.) are analyzed for test weight, protein, moisture, falling numbers when necessary and unmillable material on sensitive shipments.	Sublot samples between 18 to 60 K bushels are analyzed continuously during loading. Results recorded on ship's loading log.
Final Grade	Weighted average on factors analyzed at elevator. Composite sample from each hold is also sent to Central lab and analyzed for pesticide residue and other factors of concern.	Weighted or mathematical average of all sublots analyzed and final grade based on these results.
Quality Control	Grain is examined continuously by Department of Primary Industry for insects and other grain condition. Grain Handling Authority also designates an agency to test for grain quality on a sublot basis. Quality control is really based on having a good product coming into the elevator. No tolerance is allowed.	Sublot samples are officially analyzed at export elevator. Results are immediately provided to the elevator. A statistically sound inspection plan (Cu-Sum) is used which allows a specified tolerance beyond the contracted grade limit.